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The Truth
About Carrier IQ

Who's Zoomin' Who?
Motorola's Xoom 2

Hot Wheels
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More than Meets the Eye?
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EXCLUSIVE
Get Switched On
with Ross Rubin

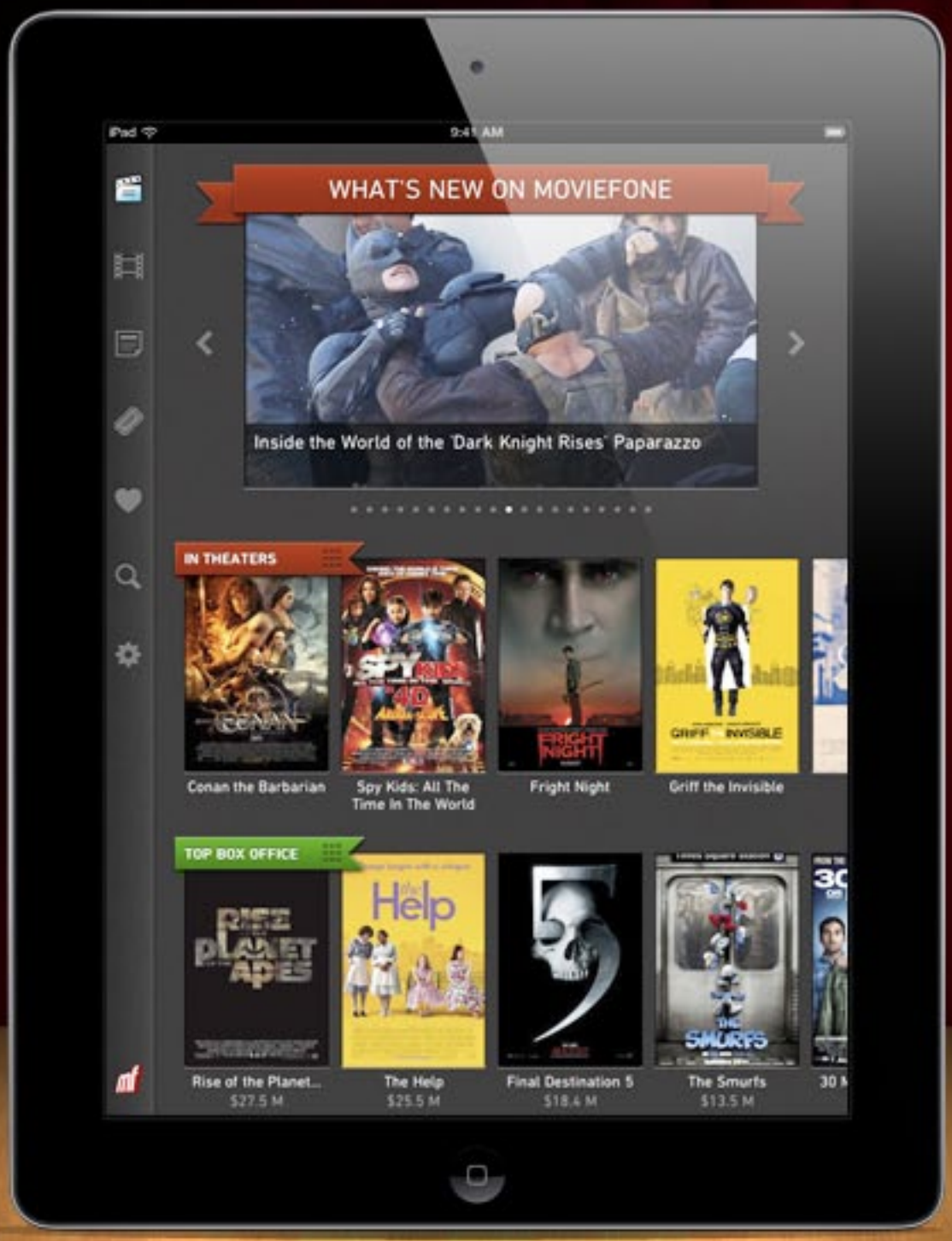
DMA2011 Digital Magazine Awards FINALIST

The Sweet Lowdown

We Get a Taste of Ice Cream Sandwich

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Carrier IQ Sneaks in and Eric Schmidt Gets Bold

Editor's Letter

As we draw another week to a close, it's hard to look back on anything but the continued fallout from Carrier IQ. If you missed all the hubbub, we learned at the end of last week that many of our mobile service providers, like Sprint and AT&T, are rather discretely running software from a company called Carrier IQ on our handsets. The code is there, at least ostensibly, to help the carriers figure out exactly what's happening on peoples' handsets when something goes wrong — dropped calls, lost connections or just generally unhelpful error messages. In other words, it's there to help make those carriers better.

The problem arose when it was revealed that this software has the ability to track an awful, *awful* lot of information about you (and me), as revealed by Trevor Eckhart in a video presentation showing just how many hooks that code has. It's able to capture every keystroke you make, read every text you receive and do lots of other potentially scary things. I say "potentially" because we have no indication that anyone's actually *doing* anything scary with it, but that potential exists, and that's more than enough to give me pause.



The issue, of course, is that this isn't an opt-in kind of feature. This isn't something you can easily disable and it wasn't something that most people even knew about. This is completely contrary to the privacy and Terms of Service warnings that inundate smartphone users at every turn, makes them all seem rather... misleading. But don't take my word for it. In this issue you can read up on what Carrier IQ is and whether you should be worried.

Google's Eric Schmidt made a pair of very bold statements at the Le Web conference in Paris, starting with a claim that, in the future, "most" new televisions will offer Google TV. We could buy that, but Eric says this future will come in the summer of 2012 — as in, about six months from now. That's a bold claim for an operating system that Logitech said "cost the company dearly" and, at the moment, is hardly taking anyone's living room by storm.

He also made the

equally bold, but more tangible, claim that "Android will be bigger than iOS," and this too will come to pass in the next six months. This was in response to a question about iOS apps often being ported to Android; Schmidt said that path will about-face by summer time. I believe he's right about this particular claim, but it's the timing that seems rather optimistic. Maybe he knows something we don't about big plans before the hazy days of 2012.

In less prescient news, Google also unveiled a version of Android 4.0 Ice Cream Sandwich that works on Intel's x86 platform, opening the door to that OS running on all sorts of questionable hardware. It also pushed out an update to fix the dreaded volume bug that's been affecting European Galaxy Nexus owners. When connected, the phone would suffer a total spaz out and start raising and lowering the volume on its own accord. Consider this a strong dose of Ritalin.

The LTE version of that phone showed up at a few choice Verizon stores, making us think its launch is closer than ever. Indeed we saw images from a Verizon inventory system indicating that the phone will drop on Friday, December the 9th — which might be today, depending on how timely you update and read Distro. But, we then got another indication that the phone was delayed. Perhaps it's due to the dispute that Google and Verizon are having over whether the phone will offer Google Wallet, a feature VZW doesn't seem to want enabled.

Despite such behavior, *Consumer Reports* rated Verizon the number one carrier in user satisfaction. That's the result of a 66,000-subscriber survey, which saw AT&T ranked last. This poll was taken before the Carrier IQ scandal broke, but that would have just reinforced this rating, as Verizon does not install Carrier IQ on its devices.

Verizon could gain even more favor in 2012 when it launches shared data plans, which would see you paying once for all the bits you use across your phone, laptop or other mobile devices, maybe. Lowell McAdam said, "I think in 2012 we will see it... Getting to one bill and getting to account-level pricing is our goal." It's a good goal to have.

RIM indicated that the next version of its BlackBerry operating system will be called BlackBerry 10, leaving behind the BBX moniker the company had previously announced. Totally coincidentally, RIM this week lost a trademark battle to use the name "BBX," as a company called Basis Interactive already owns it. The fate of the names BlackBerry 8 and BlackBerry 9, however, has not yet been determined.

Finally, Microsoft launched the latest major update to the Xbox 360, pushing last year's "New Experience" into the history books and draping the console in a freshly tailored Metro suit. The launch suffered a bit of a hiccup, but is a worthy install, speeding up navigation, enhancing voice recognition and reducing bootup times.

In this week's Distro, we'll dive deeper into an Ice Cream Sandwich than you ever thought you could, as we examine every nut and bolt that holds Google's latest OS together. We'll also take a look at the latest tablets struggling to be King of the Android hill, the ASUS Transformer Prime and the Motorola Xoom 2. We'll take another glimpse at IRL with the Engadget editors and, finally, Ross Rubin will tell us about life with Siri as your copilot. It's a big, healthy issue with a whole lot to love, so get comfortable and enjoy.



TIM STEVENS
EDITOR-IN-CHIEF,
ENGADGET



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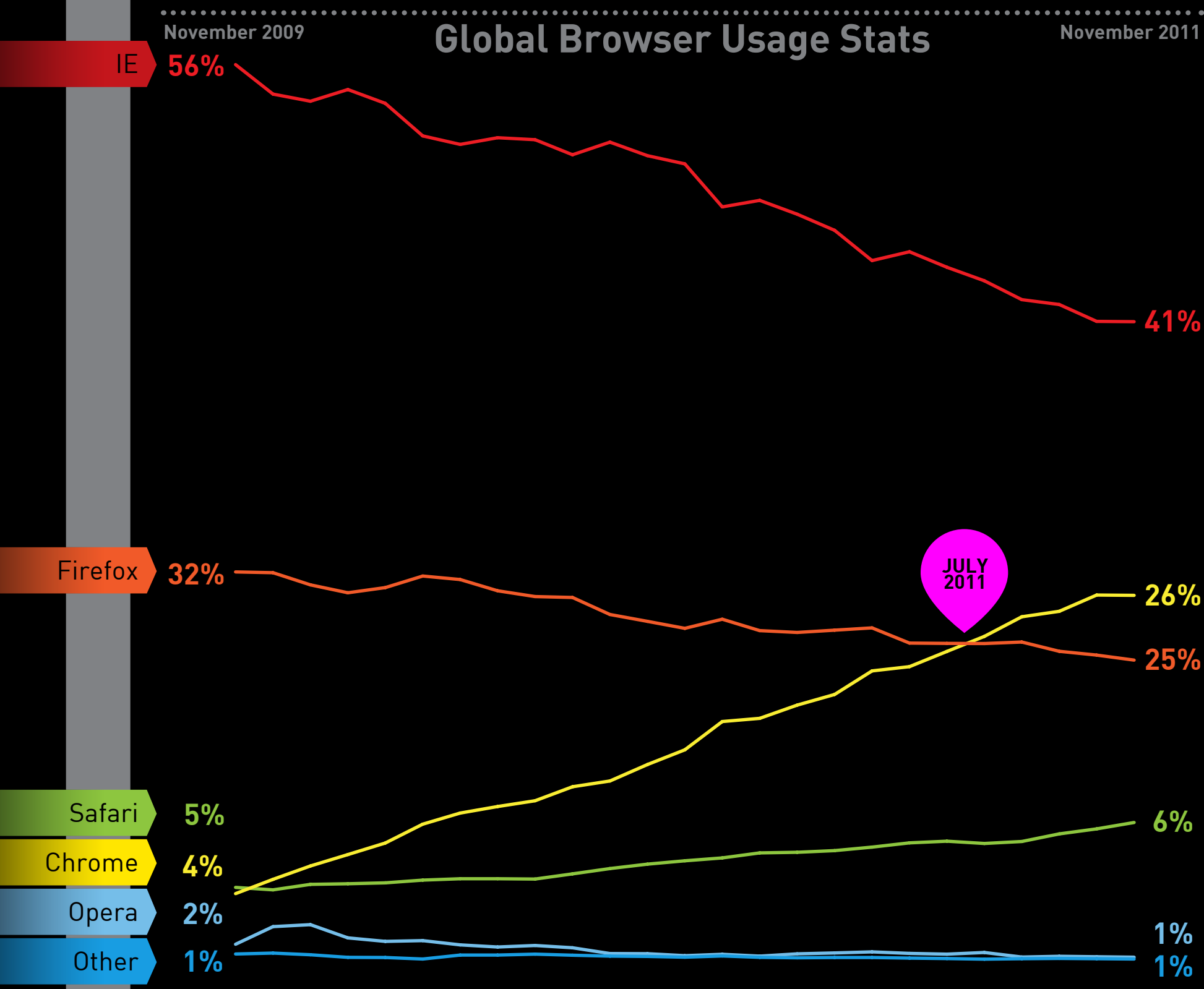
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Chrome Leapfrogs Firefox for the First Time, Still Trails Internet Explorer

The Weekly Stat

StatCounter's latest global report on web browser usage is something of a doozy. According to the analytics firm, Google Chrome overtook Mozilla Firefox for the first time last month, becoming the world's second most widely used browser. During November, Chrome accounted for about 25.7 percent of the global market, up from a measly 4.66 percent in 2009, and slightly higher than the 25.2 percent that Firefox pulled down that same month. It still trails Internet Explorer, however, which enjoys a healthy 40.6 percent market share globally, and a 50.7 percent share in the US. As the above graph clearly demonstrates, though, both IE and Firefox have seen notable declines in recent months, though the latter still has a slim lead over Chrome in the US market, with a 20.9 percent share, compared with Google's 17.3 percent cut. — *Amar Toor*

DISTRO EXCLUSIVE
READ IT HERE FIRST

A ROAD TRIP WITH SIRI

Switched On



BY ROSS RUBIN

When considering the great technology advances of the past few decades, GPS tends to get short shrift compared to such culture-rocking innovations as the internet and cellular networks. But it is a marvel nonetheless. Just a few generations ago, the idea of hopping in a car with no clue how to get to a particular destination was foolishness (or at least fodder for gender-stereotyping). Today, with an inexpensive device or smartphone software, we can do so with near certainty of finding our way. ¶ Developers of navigation apps and hardware must place great care in creating an experience that doesn't unnecessarily distract the driver. For example, quite a few "lane assist" features starkly indicate the options when coming to a fork in the road so that the driver avoids having to stare at the screen too long to figure out the right path. In addition, spoken instructions have long been a defining feature. While Telenav, for example, offers a free version of its navigation app, it doesn't include such audio. And Nokia recently followed suit with its distribution strategy around Nokia Drive, leaving the version with spoken turn-by-turn directions exclusive to its Windows Phones.

But as wonderful as navigation apps are, they have been about as passive an experience as watching TV, with the key difference of directing most of your focus away from their screens. Enter your destination, maybe pick a route, sit back and drive. Of course, there may be the occasional traffic alert (that will often be provided too late to be actionable). And then there is the new app Waze, which cues you in to trouble spots around town when you stop at a traffic light.

As our eyes have now

Ross Rubin (@rossrubin) is executive director and principal analyst of the NPD Connected Intelligence service at The NPD Group. Views expressed in Switched On are his own.

As wonderful as navigation apps are, they have been as passive an experience as watching TV.

been opened to what is possible with technologies such as Siri, though, we can imagine a more interactive but no less distracting kind of navigation experience, one that responds naturally to questions with network intelligence. At any point during a commute, to use a local example, one might blurt out something like, “How’s the Grand Central Parkway looking?” The app would then report back on the level of traffic on that highway and suggest whether you’d save time switching over.

Or let’s say a driver is heading to a party when he receives a request from the host asking to pick up some cake. The driver could have a short verbal exchange with the software about where a suitable bakery might be along the way and have the app seamlessly add in that side trip. Today, in contrast, one would have to either program the destination in advance or pull over, end the trip and search for and enter a new destination. And, of course, not all roads less taken would need to be taken while on a current route. A driver whose memory was jogged while passing a pharmacy, could set a reminder to pick up a prescription on her commute tomorrow.

GPS technology has always shined when we are on an unfamiliar path. Pairing it with an intelligent network agent, though, could imbue even a familiar journey with an unfamiliar level of convenience.



REVIEW

Motorola Xoom 2

The Motorola Xoom 2 improves on the original in almost every way. However, it's no longer the only Honeycomb tablet out there, and pricing seems far too optimistic.

BY MAT SMITH

Motorola's Xoom 2 arrives at a point where Apple's iPad (first- or second-generation) still dominates the tablet market. The original Xoom was the first tablet to arrive with Android Honeycomb, an OS dedicated to the tablet form. In the months since we gave it a middling review, plenty more tablets



arrived, faster, thinner, and more longevous (like the Galaxy Tab 10.1).

So what now? Well, Motorola has recast its Xoom: making it faster, slimmer and lighter. They've beefed up the disappointing screen found on the original, it's now a Gorilla Glass-coated IPS screen that promises 178-degree viewing angles. But Motorola has also cut more corners than the four you see before you — ones that it hopes customers won't miss.

However, with a certain quad-cored, ICS-imminent transforming tablet already stealing the hearts of many an Engadget reader (and editor), does this slimline sequel do enough to make up for its past mistakes? Is there now enough in the Android market to make Google-powered tablets a viable alternative to the iPad? Is £396 ($620) now too much to pay for a 16GB Android tablet that's *merely* dual-core? We'll be sure to try and answer all these as you read on ahead.

Hardware

Do you remember the old Xoom? Perhaps it's best described as a slab; half an inch thick, it weighed in at a pound and a half. Well, the Xoom 2 has certainly gone lean, it's now 0.22 pounds lighter, and honed to a mere 8.8mm thick. Those corners, apparently "strategically designed" to make the tablet easier to handle do exactly what they're

Our review model packs the bare minimum of what we'd allow storage-wise on a tablet: 16GB. Despite this, there are also no expansion options.

meant to do. We suffered a lot less "tablet palm" from extended gaming and video-watching sessions, although we're not sure why the curves aren't reversed. As it is, the Xoom 2 is super comfortable in portrait mode, but less so in landscape. The tablet does, however, feel reassuringly rigid. Although it may lack the shiny concentric stylings of the Transformer Prime, there's no wobble in its aluminum-framed build. The tablet has also been given an all-over water resistant coating, similar to what you'll find on the Droid RAZR. The front of the tablet has a bezel that's slightly less substantial than its Android competition, around 13mm on the vertical sides, and just under 20mm on the horizontal borders. It's marginal— we're talking fractions of a millimeter less than both the Galaxy Tab 10.1 and Transformer Prime, but comparing it to tablets from the first half of this year is a testament to how far Android tablets have come.

The first Xoom's comedic digital camera stylings on the back are now, thank-

fully, gone. A soft plastic edge runs around the tablet's lower edge and sides, surrounding a gun metal-colored panel. A rubbery power button, now accompanied by the volume rocker, is located on the back. These are accessible by your right hand when held in landscape, and are resistant enough to ignore when you accidentally brush over them to hold the tablet.

Two stereo speakers are located at the top, away from the softer edge, and thus less likely to be covered while you hold the device. At the top of the rear, a five megapixel camera is now placed (more logically) in the center, with an LED flash alongside it. On the top edge, there's the customary headphone jack, which is accompanied by something a little more exotic — an IR emitter. We managed to get this easily working with Dijit, and also its broad list of compatible TVs and devices. Along the base of the device, ports include a micro-HDMI and micro-USB port that deals with both data and charging. Yes, Motorola has retired the dedicated AC pin, although you'll probably want to stick to the meatier in-box charger rather than attempt to eke out a charge from phone adapters or, dare we say it, a USB cable. Our review model packs the bare minimum of what we'd allow storage-wise on a tablet: 16GB. Despite this, there are also no expansion options - no microSD slot, let alone SD. Granted, there's a very strong trend towards cloud-based music collections, but we'll be clutching to our files until the revolution truly takes off. There doesn't appear to be any 32 or 64GB models of the ten-inch tablet incoming, so it's something to be aware of. What's even odder is that there's a hatch along the bottom edge that could certainly receive either a SIM or some form of removable storage.



Screen

Motorola has made a conscious effort with the Xoom 2 screen. Sure, it's the same 1200 x 800 resolution, but it's now an IPS panel. Viewing angles approach the stated 178 degree mark, although you'd be hard-pressed to see much from there. The upgraded IPS TFT display makes pictures, video and, well,

everything, far more vibrant. The latest Motorola tablet does, however, still have issues with bright and outdoor lighting. The screen also seems to be more hungry for fingerprints and smudges than anything we've seen before. We're talking original iPhone-levels of fingerprint magnetism: be prepared to carry a microfiber cloth, or wear long sleeves.



Camera

While it may not be a core feature for many users, the Xoom 2 still has a five megapixel auto-focus shooter. We found stills we're generally good quality, although colors were often slightly muted. One plus of photography on tablets of this size is the ability to view your shots, full-screen immediately. Unfortunately, given the greater degree of control available on a 10.1-inch screen, there's no touch to focus feature. Instead, the Xoom 2 attempts to concentrate on what it thinks you want focused. Photography options consist of a few preset modes, color effects, exposure settings, size, quality and the ability to switch between macro, infinity and auto focus. The front-facing 1.3 megapixel camera is still here. Fortunately, nine months since we first saw the Xoom, Honeycomb's app offering has expanded and compatible voice-call services (did someone mention Skype?) make this a far more valid addition than it did on the first Honeycomb tablet.

Video capture is capped at 720p at 30fps, and the results are pretty subpar, largely due to the poor, slow autofocus. Recording moving subjects results in some pretty hazy footage. You'll find that video recording — and playback — will suffer from some very pronounced clipping if you have a handful of apps running at the same time, so it's worth restarting or doing some task management before you hit record.

"The Xoom 2 seems to offer up some very strong Vellamo web browsing scores, besting even the Transformer Prime."

Performance and Battery Life

The Xoom 2 manages to squeeze in an ARM 1.2GHz dual-core processor alongside 1GB of RAM, giving noticeable improvements in both the benchmark scores and daily use when compared to the original Xoom. Whether that's the 20 percent processor improvement, or

BENCHMARK	MOTOROLA XOOM 2	GALAXY TAB 10.1	MOTOROLA XOOM	ASUS EEE PAD TRANSFORMER PRIME
Quadrant[1]	1,841	2,083	1,745	**3,023**
Linpack Single-thread[1] **(MFLOPS)**	**45.51**	16.9	32.5	43.35
Linpack Multi-thread[1] **(MFLOPS)**	**68.87**	36.7	59.8	67.05
Nenamark1[1] **(fps)**	20.1	42.5	30.5	**60.1**
Nenamark2[1] **(fps)**	19.6	18.6	19.3	**46.1**
Vellamo[1]	**1,060**	886	923	953
SunSpider 0.9.1[2] **(ms)**	2,229	2,200	2,192.7	**1,861**

[1]Higher the score the better.
[2]Lower the score the better.

testament to Google and Moto's special relation, we don't know, but the old guard is unsurprisingly beaten across all bar one of our benchmarks. But it makes more sense to compare the sequel against its main tablet competitors.

Admittedly, the quad-core Transformer Prime has a bit more under the hood, but the Xoom 2 seems to jump through the technical hoops better than the Galaxy Tab 10.1, a similarly sized and specced dual-core tablet. It's worth noting that the Xoom 2 seems to offer up some very strong Vellamo web browsing scores, besting even the Transformer Prime. Number-crunching aside, the tablet runs smoothly, able to load up graphically intensive apps and websites without much of a struggle, though it's still suffering a Honeycomb hangover of occasional stutters and random app crashes.

Despite the slimmer style, the battery still manages to outperform its older brother. The IPS screen doesn't seem to take much toll either; with almost nine hours of continuous video playback from a full charge, running on 50 percent brightness, WiFi enabled. It's a strong performance, but the competition is stronger. On day-to-day use, it's more frugal; we got a good day and a half of casual use, with Twitter and email notifications throughout the day, and a heavy dose of *Shadowgun* action at lunch.

Software

Fortunately, Motorola has taken a pretty *laissez faire* approach to Honeycomb (version Android 3.2, to be exact). It flies in the complete opposite direction to the heavily styled backgrounds, widgets and apps found on the Droid RAZR. Pre-installed apps are lightweight, inoffensive additions. There are

TABLET	BATTERY LIFE
Motorola Xoom 2	**8:57**
Apple iPad 2	10:26
ASUS Eee Pad Transformer Prime	10:17
Samsung Galaxy Tab 10.1	9:55
Apple iPad	9:33
HP TouchPad	8:33
Lenovo IdeaPad K1	8:20
Motorola Xoom	8:20
T-Mobile G-Slate	8:18
Samsung Galaxy Tab 7.0 Plus	8:09
Lenovo ThinkPad Tablet	8:00
Archos 101	7:20
Archos 80 G9	7:06
RIM BlackBerry PlayBook	7:01
Acer Iconia Tab A500	6:55
T-Mobile Springboard (Huawei MediaPad)	6:34
Toshiba Thrive	6:25
Samsung Galaxy Tab	6:09
Velocity Micro Cruz T408	5:10
Acer Iconia Tab A100	4:54

several business-oriented apps here, like Quickoffice HD, Twonky and Citrix, while Motorola's own music streaming app, MotoCast requires pre-registration, but is a relatively painless way to add your collection of music, photos and videos to the Xoom 2.

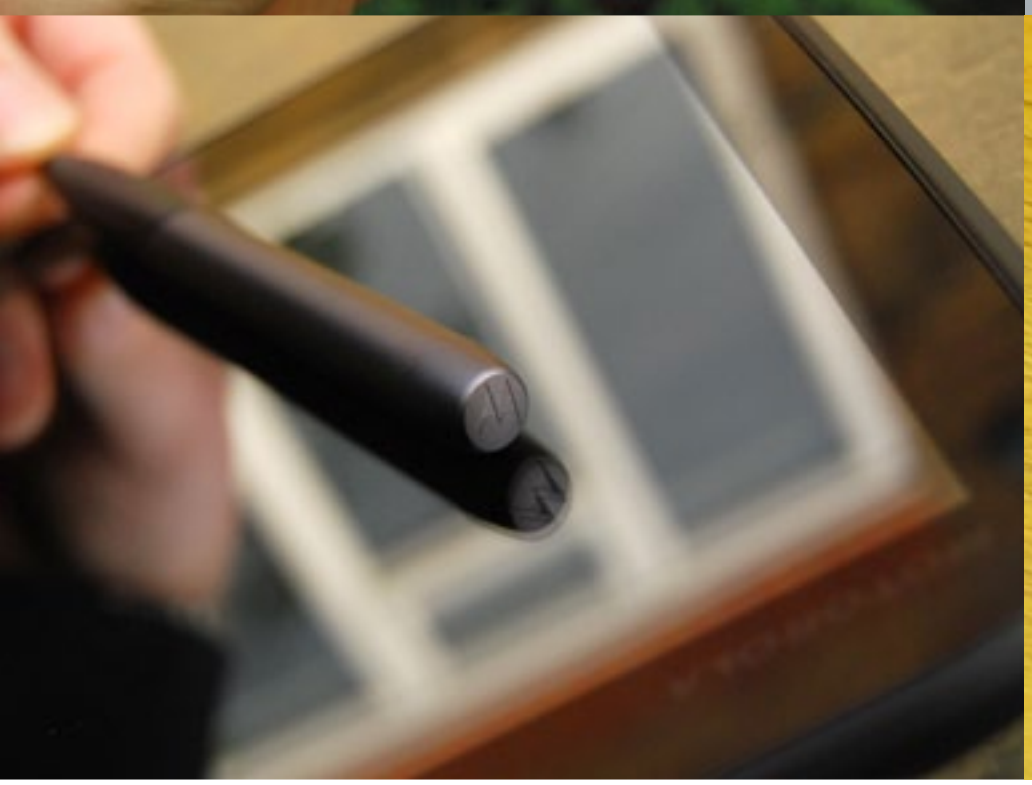
Motorola has added what it's calling Intelligent Grip Suppression to both the Xoom 2 and its Media Edition sibling. We're calling it a great idea; it allows you to grip the tablet's screen while still allowing multitouch scrolling and zooming. In practice, it's pretty good at detecting your grip, though the web browser will occasionally zoom, rather than obey your commands to scroll. The browser itself often gets confused by flash content, with video often clipping like the camera does when several apps are already open. The stock keyboard here is the typical fare, with buttons plenty large enough to avoid mistakes. However, the wide-screen nature of the Xoom 2 in landscape means we found that we had to stretch in landscape mode to reach the middle range of the keyboard. Again, we reverted to SwiftKey Tablet X, where a split-up board solves this problem.

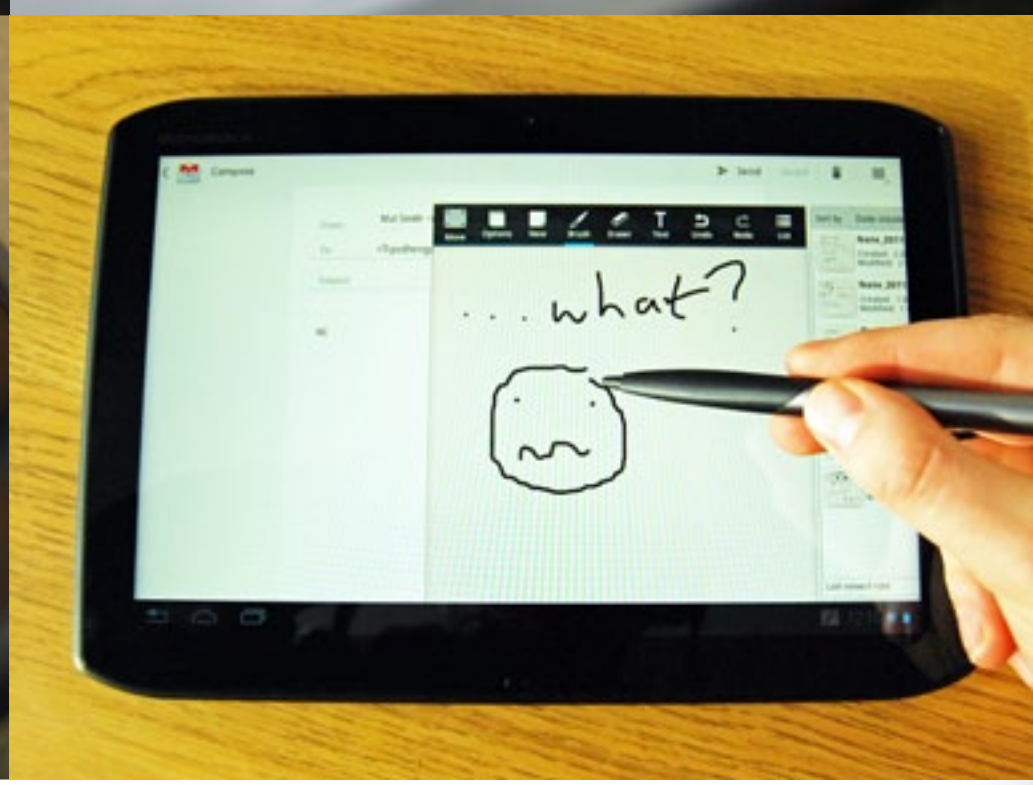
Stylus

An optional extra, we managed to get our hands on the Motorola Active Stylus, priced at £22 ($34), and working exclusively with software found on the 10.1-inch Xoom 2. Motorola has told us it won't be playing with the smaller screened Media Edition. Well, it will — it'll work on any capacitive screen, you'll just miss out on the dedicated Floating Notes app. The stylus (which requires a AAAA battery) works across the full gamut of Honeycomb apps and menus. There's a decent heft to it, and it makes a satisfying tap noise on the Gorilla Glass display.









Hitting the ever-present notepad icon in the lower right corner will proffer a few options: it'll launch the Floating Notes app replete with a blank canvas, open any previous sketches or annotations, or finally, Evernote. The final option is semi-integrated into Motorola's stylus software. It's a little half-baked as any stylus interactions have to be done in Floating Notes and then shared across to Evernote. Sadly, there appears to be no ability to make quick 'n' dirty annotations on the top of emails, photos or webpages, something that was a boon to using the stylus-centric HTC Flyer. The lack of a native screen grab - and we know there are other ways — also works against the stylus. Apps willing to interact with the stylus are a bit short on the ground — Diopen is the best handwriting input app we've found so far, but that will also work with your finger.

Wrap-Up

The Xoom 2 is a stylish successor to the original Honeycomb tablet. The build quality is much improved, and Motorola is on the right track with those oddly shaped corners and built-in IR emitter. There has been an explosion in Hon-

Competition's a lot tougher, and while Motorola's upped its game, it's not by enough to come out on top.

eycomb tablets since the first Xoom launched, and while the sequel does plenty right, it isn't enough to claim the head seat at the Android tablet family table. Fortunately, the Xoom 2 has bypassed Moto's tendency to over-tinker with the core Android experience on its phones, resulting in a pretty reliable tablet, although it still behaved erratically with video content

While camera shortcomings on a tablet may not be a massive deal-breaker, lack of tap to focus and poor auto-focus on the video camera are frustrating. Because of a lack of expandable storage (and beefier models), users will be drawn into the world of cloud media management, whether they want to or not. It's telling that the Google Music app comes preinstalled on this UK review model — somewhere the beta isn't yet available. While the Xoom was — for a time — the best Honeycomb tablet, it was also the only Honeycomb tablet. But competition's a lot tougher, and while Motorola's upped its game, it's not by enough to come out on top.

Mat is a contributing editor who lives in the UK. He's a Liverpool supporter and enjoys Japanese gameshows.

BOTTOMLINE

Motorola Xoom 2

£396 ($618)

PROS

- Lighter and slimmer than its predecessor
- Splashproof coating
- (Almost) undiluted Android experience
- Built-in IR emitter

CONS

- Only 16GB of storage: lacks expansion option
- Fingerprint magnet

» The Motorola Xoom 2 improves on the original in almost every way. However, it's no longer the only Honeycomb tablet out there, and pricing seems far too optimistic.



Thule Crossover Backpack, Technocel Battery Boost and Upgrading from Firefox 3.6

BY ENGADGET STAFF

Welcome to IRL, an ongoing feature where we talk about the gadgets, apps and toys we're using in real life and take a second look at products that already got the formal review treatment.

It's funny how eerily quiet things get after Thanksgiving weekend. Except for some tablets going on sale, lots of companies are saving their finest wares for CES, which kicks off just after the New Year. Until then, we'll keep on keeping with the stuff we already own. Mat finally realized a backpack that won't send your gadgets crashing to the floor is a worthy investment, Andy's settled on a cheapie portable charger and Darren's at last upgraded to Firefox 7.0 (he's so *crazy*!). Which backpack is slowly sweeping the staff? And what was Engadget's managing editor doing using FF 3.6? Find the answers to that and more when you read on.

Part Battery Charger, Part Micro-SD reader

Technocel's Battery Boost has been one of the most useful gifts I've ever received. Doubling as a microSD reader, this juice pack claims it'll give your phone an hour of extra talk time, and so far, I've got no evidence against it. Surprisingly, it only takes about 15 minutes or so to completely charge. I couldn't count how many times I've used its bantam micro-USB flexi-arm to recharge my HTC





Desire. Though the Boost has never saved my life with that last phone-call-in-distress, I *have* been able to get a few more pics and tweets online when I otherwise couldn't. Extreme handiness.

Despite its glory, there are a few quirks I should mention. First of all, the first Battery Boost I owned fried itself—for no apparent reason—while connected to my phone. Fortunately, there were no flames, but the room smelled of solder. What's amazing is that it continued to read the microSD, even though it would no longer charge any device. Secondly, this thing's a monster! Huge! About three times the size of an everyday flash drive. I literally have to prop my MacBook Pro up on something so I can plug it in. (It can also turn pocketing your keys into a major hassle.) The large size is a definite issue, but in its defense, the Boost is a sturdy little bugger. I've experienced its resilience first-hand by dropping it onto a highway going 60MPH. Its dark grey color doesn't help you find it in a ditch, but despite the scars, the beast still works like a charm. All in all, I'd say it's well worth the $24 price listed on Amazon.

— Andy Bowen

Pockets upon Pockets

I'd largely ignored buying a work-specific bag. Normally, my messenger would have sufficed for carrying around a laptop, notepad, charger and phones. Add in my aging DSLR and video camera and things got slightly more precarious. While covering the launch of some new product or another, the burden proved too much, and one of the strap fasteners snapped. Fortunately, I was still caffeinated enough from the briefing to react and capture the bag before cameras, MacBooks and other expensive—and loaned—goods hit the deck. However, I needed a replacement, and soon. As I browsed around Amazon, specialty bag shops and eBay, I balked at some of the prices. I decided to set the mark at £100 ($155), enough for something a little more special than some stock bag that would barely shield all my equipment.

I then saw my trans-Atlantic colleague Zach trying out Thule's Crossover backpack - it was exactly what I was looking for. To be honest, I had spotted the same bag at an Apple Store, but resisted. No one buys those things, right? But, I wanted it. I sniffed around the review sample Zach was trying out,

and it looked good: there's a capacious padded sleeve for my laptop and a medley of zips divide up the front of the bag, with each one giving way to yet more separators and pockets. For SD card-juggling, USB-cabled junkies like me, there's space for everything.

Admittedly, I'm still in the honeymoon period, but as I near the two-month mark the Crossover feels worn-in, with no signs of wearing through. The straps are both comfortable and breathable—ideal for high-octane, sweaty trade shows and for safely lugging around my equipment for day-to-day work around town. I also feel secure knowing that my laptop is flush to my back, unlikely to hit against anything. Other Engadget workers may find the lack of a padded storage space for a DSLR an issue, but I prefer to have a dedicated case for the camera, and ample customizable storage for outside work hours. *— Mat Smith*

Retiring Firefox 3.6

Firefox 3.6. Do you even remember that? Here we are, many (many!) generations later, and I just stopped using v3.6 about a month ago. Why? First off, I'm a creature of habit. Secondly, I had that browser customized *just so*, and in this line of work, changing anything could mean weeks—if not an eternity—of frustration. I knew that some of my archaic plug-ins wouldn't update with fresher builds of Firefox, but at some point, I realized that I couldn't last



another day with that browser's horrific memory problems.

Firefox 3.6 was charming and highly functional when it launched, but open up 20-plus tabs, and it drains resources like no other. But despite the facts, I hung with it. It was there for me. We liveblogged together. We fought with one another, spiritually. And I just enjoyed seeing the refresh button on the left of the address bar. Earlier builds of Firefox took a (deserved) amount of flack for chewing up RAM and never spitting it out, but if not for that browser's innovation, would Google or Apple have any incentive to improve Chrome and Safari?

I may have left Firefox 3.6 behind, but I'm still not hopping into that bandwagon of crazies known as the "early adopters." I wrote this in Firefox 7.0.1—so, sue me. *— Darren Murph*

ASUS Transformer Prime

The Transformer Prime is the best Android tablet of the moment, hands down.

BY DANA WOLLMAN AND TIM STEVENS

Is there any tablet that's hotter than the Transformer Prime right now? (Please, don't say the Kindle Fire.) For weeks we geeks, early adopters and people who love their tech toys have been awaiting this, and none too patiently. Make no mistake: this will be one of the slickest products we test this year and it isn't just because the original Transformer had such an inventive design. The Prime is the first device packing NVIDIA's hot-off-the-presses Tegra 3 SoC, making it the world's first quad-core tablet. This comes with promises of longer-than-ever runtime and blazing performance (five times faster than Tegra 2, to be exact), all wrapped in a package measuring just 8.3mm (0.33 inches) thick — even skinnier than the iPad 2 or Galaxy Tab 10.1. Throw in









specs like a Super IPS+ Gorilla Glass display, eight megapixel rear camera and a confirmed ICS update in the pipe and even we seen-it-all Engadget editors are drooling.

All of which means we dropped just about everything when a 32GB Prime showed up on our doorstep earlier this week, and soon enough, you'll have your chance to nab one too. ASUS announced recently that the WiFi-only models will be available through online sellers the week of December 19th, and in retail the week after. (No word on 3G versions for the US just yet.) It'll start at $499 for the 32GB model — not bad considering five hundred bucks is the going rate for a high-end tablet with 16GB of storage. From there you can get a 64GB number for $599, while that signature keyboard dock will set you back a further $149. Worth it? Read on to find out.

Hardware

The Prime looks familiar and no, it's not just because we're looking at a device that's dominated by a 10-inch slab of glass. If you've been following the recent explosion of Ultrabooks as obsessively as you have Ice Cream

...The Prime is every bit as well-made as you'd want your $500 tablet to be.

Sandwich, then you know the second-gen Transformer shares its industrial design with ASUS' line of Zenbooks, which went on sale back in October. Like those skinny laptops, the Prime features a spun metal aluminum lid, this time available in "amethyst gray" and "champagne gold." Sure, there will be some who think these brushed metal digs would look more appropriate on a trendy kitchen appliance, but many of you will appreciate how distinctive this tablet looks — and how nicely that faint circular pattern masks fingerprints and scuffs. In case it wasn't obvious when we reviewed the UX31, you can count us among the second group. We think it looks great. If, however, you think the Zenbooks are a little too fashion-forward, the whole spun metal thing manages to look less aggressively industrial in this tablet form. Maybe it's because the Prime comes in a warmer, more inviting gold. Maybe it's just that the Zenbooks have a severe, pancake-flat shape that makes them look painfully futuristic. Whatever it is, the Prime is just as lovely, though something tells us it'll be somewhat less polarizing.

Moving past aesthetics, there's no denying the Prime is every bit as well-made as you'd want your $500 tablet to be, and we just can't get over how thin and light it is. Oftentimes, we make excuses for metal tablets, such as the 7-inch T-Mobile Springboard and HTC Flyer (hell, let's throw the first-gen iPad in there, too). We're used to saying, "Well, yeah, it's kind of dense, but at least it's well built." In the case of the Prime, though, its 0.33-inch-thick frame makes it a smidge skinnier than the Galaxy Tab 10.1 and, at 586 grams, it's a wee bit lighter, too. Despite that it manages to feel considerably more premium. That's at least partly thanks to that metal construction, which we can't help preferring to the feel of plastic — at least, that is, when this is both thinner *and* lighter than something made of the stuff. That's not to say the 10.1 feels flimsy, just that this feels better.

It must be said, though, that it doesn't necessarily feel better in the hand. While the Galaxy Tab 10.1 has gentle, rounded edges that respect your meaty mitts, the Transformer Prime is instead a tapered curve with a somewhat sharp edge. It's the same sort of shape as the iPad 2 and, while it certainly isn't uncomfortable to hold, the terminating edges of this device can cut into the more vulnerable bits of your palms after a long period of use. This does, at least, help the tablet turn into a nice clamshell shape when paired with its dock, the accessory that turns this thing from being merely a very nice tablet into a potential laptop replacement.

As far as ports and other such trap-



pings go, the optional dock naturally steals the show with its full-sized USB 2.0 socket and SD card reader. The selection on the tablet itself is a little light — but no more or less than most slates. Pick this guy up in landscape mode and you'll find a 1.2 megapixel front-facing camera looking at you, with an eight megapixel, f/2.4 shooter 'round back, coupled with an LED flash.

On that top edge you'll find a lone power / lock button with a wee tiny LED indicator built-in, tucked over in the left corner. Look down on the opposite side and you'll see the proprietary connector that allows the tablet to slide neatly into the dock. This handles all the data exchange with the dock itself and, if you want to get data off the thing, this is how you'll have to do it. There's no standard micro-USB connector here.

There are two other openings on the bottom that serve as receivers for a pair of latches built into the dock. These come plugged up with bits of rubber when you unbox the tablet, so be sure to clear them before your slate has its first curious encounter with the dock. Still holding it in landscape, you've got a 3.5mm headphone jack on the right side, which cuts a rather drastic profile thanks to the heavily tapered edges, while the left edge houses a volume rocker, mini-HDMI socket and — happy day — an unoccupied and uncovered microSD slot.

With or without the heroic prefix and mathematical designator it's safe to say this is a very nice panel.

Rounding things out is a single finely cut speaker grill, sitting on the right side under the back. This of course dismisses any hopes of stereo sound but, more troublingly, places that single tweeter exactly where your palm is likely to go should you be holding it with your right hand. Of course, you can always just flip the tablet over should the dialogue from that episode of *SVU* you're streaming get a little more muffled than usual, but we'd have preferred the speaker somewhere on the top. Or, even better, facing right at you, as on the new 10.1N. We are happy to report that, when unimpeded, the volume coming out of the lone speaker is actually quite good.

Display

ASUS, apparently jealous of the increasingly lengthy string of designations Samsung is applying to its OLED displays, has crafted what it calls a Super IPS+ LCD for the Transformer Prime. With or without the heroic prefix and mathematical designator it's safe to say this is a very nice panel. What you have here is a 10-inch, 1280 x 800 display that manages a stunning brightness maxing out at 600 nits, handily topping what you'll find on most laptop panels and more than 50 percent higher than your average tablet panel. The luminosity is quite noticeable, and the contrast too, with deep darks and vibrant brights. However, color reproduction seemed a bit flat, with whites tending toward yellow and brighter hues coming up short.

If you're using this tablet indoors you won't need to go anywhere near maximum brightness to get an eyeful, though we won't blame you if you crank it up anyway. Should you want to dial things down, though, ASUS allows you to disable that 600-nit, Super IPS+ mode to extend the battery life. Even when we did that and dialed the brightness down to 50 percent, the display was still quite arresting.

The viewing angles are also exceptionally wide, which will come in handy if you and a friend decide to prop the tablet up in the dock and watch a movie together. ASUS claims 178-degree visibility and indeed, we were able to make out the screen clearly from severe side angles. From the front, too, the colors stayed strong even as we dipped the screen farther and farther forward — an area where even high-end displays on MacBooks start to show their limitations. That yellowish hue did start to darken when we took the angles to extremes, but even then we could still follow what was happening onscreen without issue.



Despite the fact that ASUS calls this the Transformer, out of the box it isn't even a Gobot.

The Dock

Despite the fact that ASUS calls this the Transformer, out of the box it isn't even a Gobot. To make the thing live up to its name you'll need to spring for the $150 signature accessory: the keyboard dock. Let's start by being clear on one thing: this is not the old dock, rebadged to go with this brand new tablet. It, too, has gone on a diet and, thanks to some slimmer dimensions, it won't be compatible with your first-gen Transformer. (Sorry, early adopters.) The good news is that even with the dock attached, the tablet is thinner and lighter than a netbook (remember those?) and, shockingly, better-built than most were. You can easily stuff the whole thing in your messenger bag with plenty of room left for, well, anything, really.

To connect the tablet to the accessory you simply flip-up the connecting port on the back of the dock and slip in the Transformer. While the thing sadly does not make the iconic Transfoming sound, it does at least latch securely thanks to those two metal hooks that grab on and won't let go as soon as it's slotted into place. Won't let go, that is, until you slip a release to the left, at which point you can easily lift the thing free.

As soon as the Transformer falls into place something magical starts happening: the battery gets recharged. There is a second battery inside the dock and it nobly sacrifices its own

juice so that the tablet can live on. So, plug a nearly dead tablet into a full dock and, after some time, you'll have a full tablet and a dead dock. That means, if nothing else, this is a very handy $150 external battery.

But of course it's also a heck of a lot more than that. With this you'll get a full USB 2.0 port and an SD card reader, giving you yet another way to expand the storage. You can use that USB port to plug in an external mouse if you like, but the idea is of course to instead use the little trackpad that's built into what is ostensibly a wrist-rest at the bottom of the keyboard, but, thanks to the petite dimensions here, it doesn't offer much respite at all.

That trackpad may be small but it is at least reasonably responsive, letting you use gestures for scrolling webpages and even for navigating around the tablet's myriad home screens. (Though if you want to pinch-zoom you'll have to reach up on the display.) In fact if anything it's too responsive, picking up the most subtle of brushes from your fingers as you type, often causing the cursor on your tablet to jump unexpectedly and unwantedly. There's no way to disable the trackpad automatically while you're typing, which is a major annoyance.

Also annoying are the trackpad buttons, built into the bottom. Push in on the left for a primary click and on the right for secondary, but try and click anywhere toward the middle and it just won't move a bit. The button itself seems plenty wide, but only the outer extents can actually be clicked. Thankfully you can simply tap anywhere and just ignore the buttons altogether.

The keyboard itself is passable, but far from good. The island keys are tiny and have a very light touch to them, but we just wish for a bit more room. Everything is cramped, but it must be said, most of the important keys are reasonably generously sized — except, unfortunately, for the right shift.

One final annoyance: when mounted in the dock, the whole contraption is disconcertingly top-heavy, the Transformer itself weighing considerably more than the lid of your average laptop. This made the thing very prone to tipping over backward. In fact we inadvertently sent ours tumbling off of its perch and toward the floor while writing this very section of the review. Some deft reflexes, honed on years of *Samurai Showdown* and its ilk, saved our tablet from crashing into the floor, but suffice to say you should always use yours in a secure location.

But the question, of course, is whether you should use this dock at all, and we honestly think that we might. While typing on a keyboard this small is certainly a chore, it sure as heck beats using an on-screen keyboard. And, while we aren't entirely fond of the trackpad, it certainly makes selecting blocks of text much easier than tapping and dragging and tapping again with your fingers on the screen. Oh, and in case you're wondering, the experience is far better here than on Motorola's various lapdocks.

BENCHMARK	ASUS EEE PAD TRANSFORMER PRIME
Quadrant	3,023
Linpack	43.35 (single-thread) / 67.05 (multi-thread)
Nenamark 1	60.07
Nenamark 2	46.07
Vellamo	953
SunSpider 0.9.1	1,861

Performance and Graphics

The Prime is something of a curiosity around these parts in that it's the first tablet to ship with NVIDIA's quad-core Tegra 3 SoC. Actually, let's just call it what it is: the first quad-core tablet, period. We've run our usual spate of benchmarks, and the combined scores are among the highest we've yet seen, handily beating the Galaxy Tab 8.9 and 7.0 Plus we recently tested in most cases.

Suffice to say, all the mundane bits — swiping through menus, opening apps — run as briskly as you'd expect on a quad-core slate. The Prime's display is as responsive as it is gorgeous, and we made ourselves at home quickly — so much so that we found ourselves tapping the screen even when we were plugged into the dock. Make no mistake: the Prime is fast, but we suspect Honeycomb's 3D animations aren't the best way to highlight this, given that dual-core Tegra 2 can stomach these flourishes well enough already.

That said, we were sorry to still see some occasional stutters and hiccups from time to time, instances where the device would hesitate for just a half-second or so before responding. There are three performance modes that are easily selected between in the pop-up settings menu, but even on its highest we couldn't get it to be a consistently smooth operator. They're the kind of stops and starts we've seen on just about every Android device to date and it's a bit of a shame that even four whopping cores running at 1.3GHz can't do away with them.

Battery Life

Yes, wow. Pity the Engadget editor who had to babysit this thing while it ran unplugged, looping through our battery drain test for hours and hours. ASUS says the Prime's 22Wh pack should last a maximum of 12 hours without the dock and indeed, it squeezed out an impressive 10 hours and 17 minutes in our battery rundown test, which involves looping a video with the brightness fixed at 50 percent and WiFi on but not connected. That's a scant nine minutes short of what the iPad 2 accomplished in the same test, a difference that could just as well swing the other way should we test these two a second time. This was also running in standard power mode — upshifting to economy mode likely would have delivered an even more longevous result.

Much of this is thanks to the new Tegra 3 chipset, which is not only fiendishly quick but also freakishly efficient. The chipset is capable of processing each

TABLET	BATTERY LIFE
ASUS Eee Pad Transformer Prime (with dock)	**16:34**
ASUS Eee Pad Transformer Prime	10:17
Apple iPad 2	10:26
Samsung Galaxy Tab 10.1	9:55
Apple iPad	9:33
HP TouchPad	8:33
Lenovo IdeaPad K1	8:20
Motorola Xoom	8:20
T-Mobile G-Slate	8:18
Samsung Galaxy Tab 7.0 Plus	8:09
Lenovo ThinkPad Tablet	8:00
Archos 101	7:20
Archos 80 G9	7:06
RIM BlackBerry PlayBook	7:01
Acer Iconia Tab A500	6:55
T-Mobile Springboard (Huawei MediaPad)	6:34
Toshiba Thrive	6:25
Samsung Galaxy Tab	6:09
Velocity Micro Cruz T408	5:10
Acer Iconia Tab A100	4:54

frame that's rendered to the screen and determining the minimum necessary brightness of the backlight to properly display it. The backlight is constantly cycling up and down while the color temperature is dynamically cycled to compensate. The net result: great visuals and killer battery life.

ASUS promises a further six hours of dependability when docked with the keyboard and we're happy to report that figure is right on the mark. We clocked in at 16 hours and 34 minutes when running with the keyboard dock. That's a huge figure.

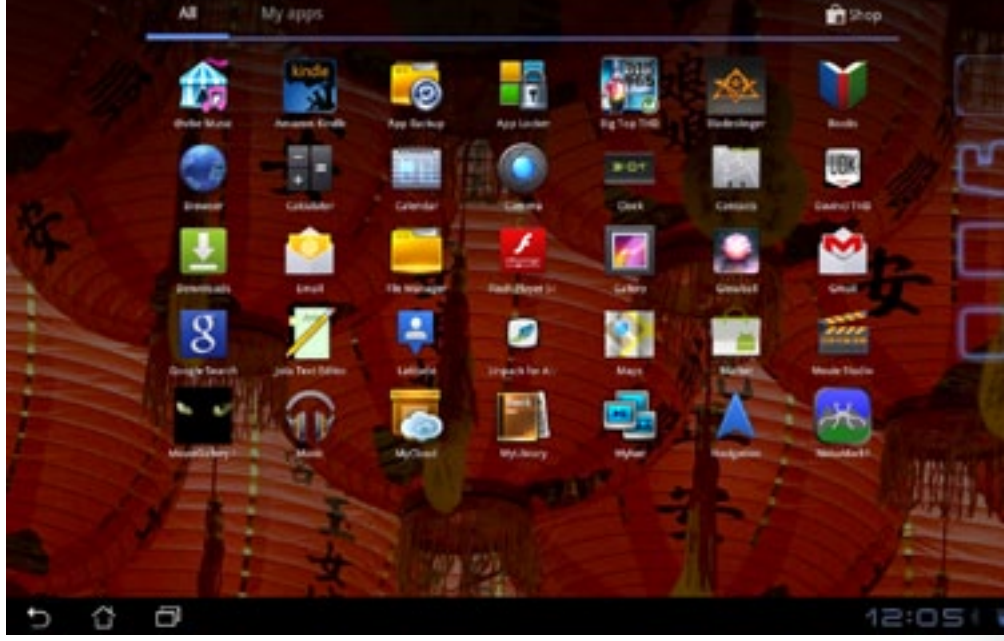
We should also tell you that the Prime can charge via the bundled AC adapter or over USB. But — and there is a but — the dock doesn't yet support USB charging, so if you want to prime yourself for a potential 18 hours of runtime, you had best start out near an outlet.

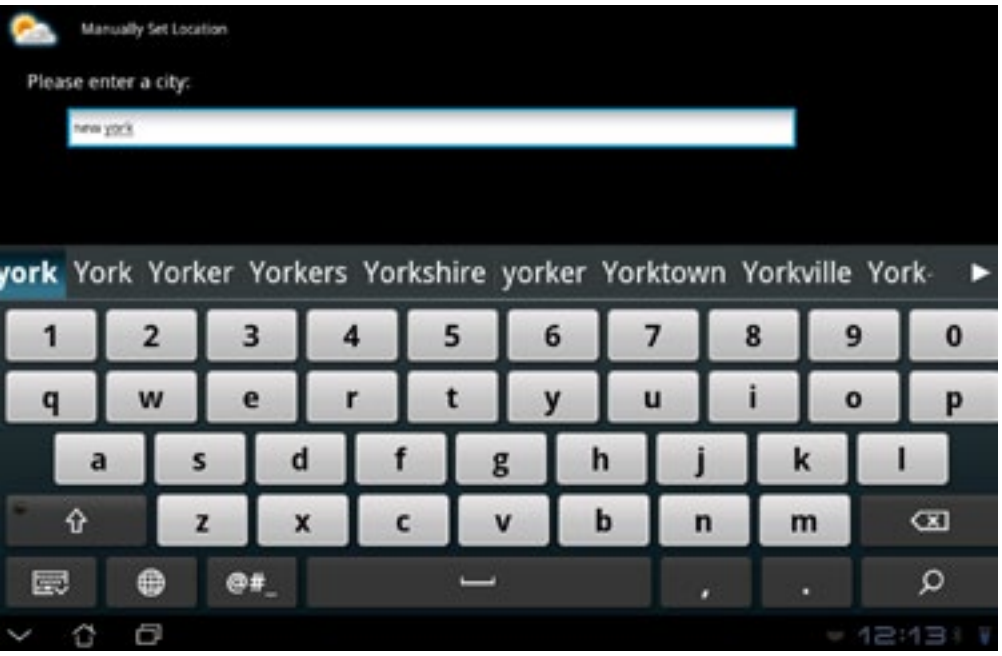
Software

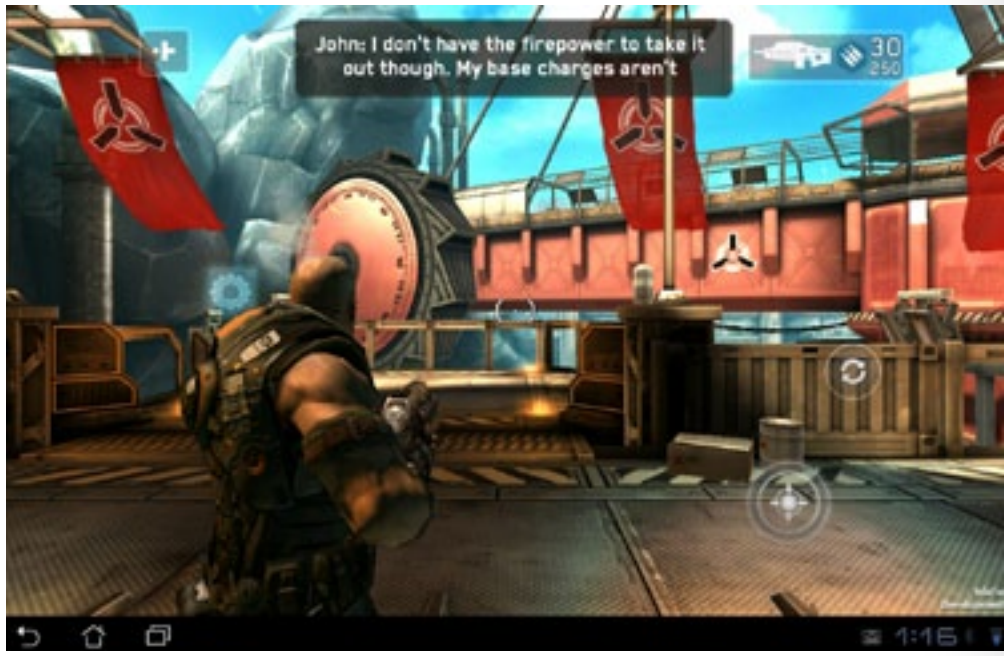
We wish we could use this as an occasion to walk you through ICS on a tablet but alas, that day isn't upon us just yet. The Prime ships with Android 3.2.1, and you know what that means: Honeycomb, jazzed up ever-so slightly with a few removable widgets, power management profiles and handy settings shortcuts, which you can access by swiping or tapping the clock in the lower-right corner. Those settings, by the by, include Bluetooth, WiFi, IPS / Super IPS+ mode and auto-rotation for the screen. It's quite similar to what Samsung is packing in its TouchWiz'd Galaxy Tabs these days.

Those widgets, meanwhile, are pretty harmless and not particularly exciting, with weather and mail, as well as a larger one that cobbles together weather, calendar, music, Gallery access and a shortcut to the last website you visited. Again, these are easy to dump if you like









your homepages a little more pristine, as we typically do.

As for pre-installed apps, the Prime comes with @vibe Music, Amazon Kindle, App Backup, App Locker, *Big Top THD*, Bladeslinger, Google Books, *Davinci THD*, File Manager, *Glowball*, Movie Studio, MyCloud, MyLibrary, MyNet, Netflix, Photaf Lite, Polaris Office, Press Reader, *Riptide GPk-ShadowGun*, SuperNote, WebStorage, *yskk*, *Zen Pinball THD* and Zinio. Yes, that's a lot of games, and you'll want to be using them — if only to show off just how good this thing is at 3D gaming.

And it is good. Very good. *ShadowGun* is the showcase title here and it runs beautifully. NVIDIA has been promising "PC-class" graphics and, while we wouldn't quite take it that far — the game lacks some of the visual polish of top-shelf PC shooters — it is safe to say these are the best graphics we've yet seen on a tablet. The water effects in particular are very good, and more importantly it's a fun little shooter.

Camera

We're usually quick to dismiss the cameras on tablets because, really, other than the odd video chat just because you can, we don't ever find ourselves flipping on either front or rear sensor. But, we dutifully did here to test out the Transformer Prime's picture-taking abilities and, it must be said, it does an admirable job with its eight megapixel rear shooter. Its auto-focus sometimes took a bit too



long to make up its mind and the resulting pictures occasionally seemed undersaturated, but the camera took more than acceptable looking images even in less than optimal conditions. So, if you really want to lug around a 10-inch camera, you could do a lot worse.

Wrap-Up

The Galaxy Tab 10.1 has had a long run as the top-tier Android tablet in the 10-inch size, but that position has now properly been usurped. The original Transformer was a very good tablet and it successor steps up another notch. The Transformer Prime is thinner and lighter than the rest and, with 32GB of storage available for a dollar under $500, it's a better deal than most of the top-tier contenders.

The dock, however, is a bit of a tougher sell. If you need crazy battery life on the road then it's definitely a good choice, even if you won't be relying on that cramped keyboard too often. In fact, the less you have to use that part the better, but it's still a perfectly usable way to enter URLs and it sure beats the pants off of any virtual, touchscreen text input method.

For the moment the ASUS Eee Pad Transformer Prime is the best Android tablet on the market. All hail the new king.

BOTTOMLINE

ASUS
Eee Pad Transformer Prime

$499+

PROS

- Great battery life
- Thin, light, high-end design
- Solid performance
- Good value

CONS

- Occasional hiccups and stutters
- Keyboard on dock is less than perfect

» The Transformer Prime is the best Android tablet of the moment, hands down.

Dana Wollman is Reviews Editor at Engadget, a marathoner, lover of puns and a native Brooklynite. Tim Stevens is Editor-in-chief at Engadget, a lifelong gamer, a wanna-be racer, and a born Vermonter.



TOKYO MOTOR SHOW 2011

東京モーターショー

Auto shows have become as prevalent in major metropolitan areas as comprehensive political protests or holiday parades, but the biennial Tokyo Motor Show isn't your run-of-the-mill vehicle showcase. Sure, you can still find everything from exotic autos to family sedans on the floor, but as Japan's major venue for demonstrating industry innovation, you're just as likely to stumble upon a 20-year urban EV concept at the Tokyo Exhibition as you are a petrol-powered pickup. Last week, we scoured Tokyo Big Sight on the hunt for cutting-edge vehicle tech, stumbling upon countless captivating designs. Many of the models on hand were early concepts — some drivable, others hollow mockups — and if the abstract vision of auto designers ever does come to fruition, there's little question that the vehicles of tomorrow will be a far cry from what we see driving down the highway today.

— BY ZACH HONIG









VIEW ON WEB

DAIHATSU FC SHOWCASE CONCEPT

Who doesn't want a 60-inch TV in a van?

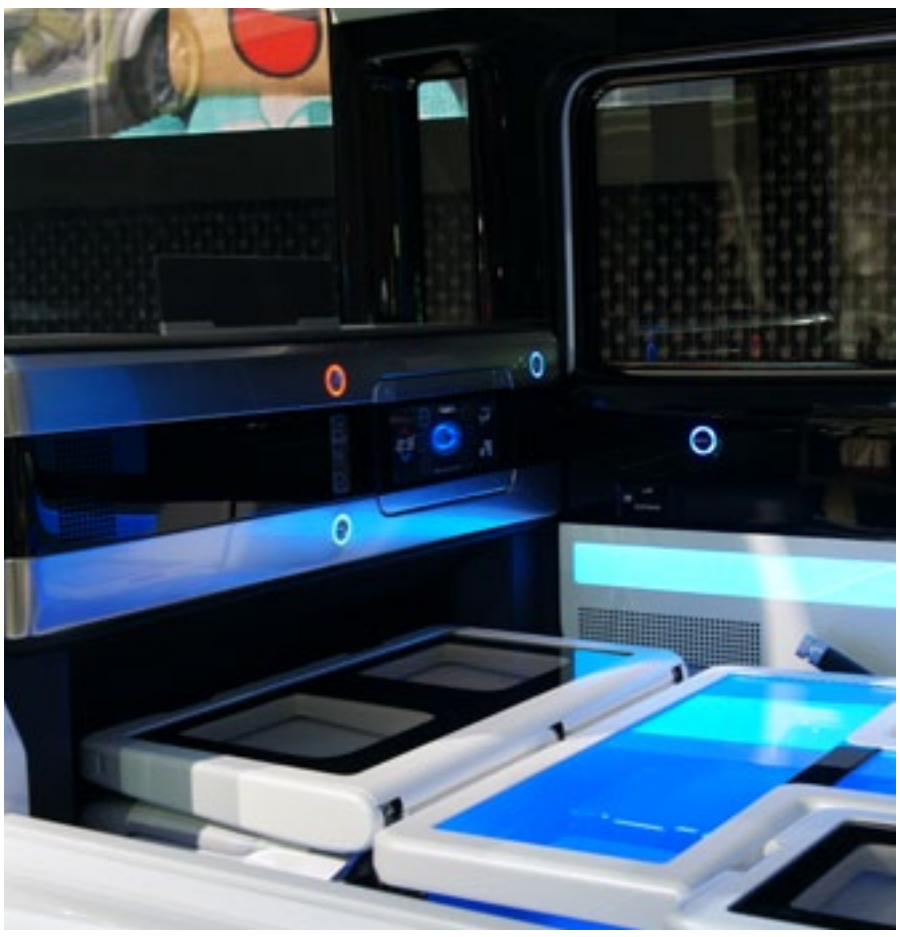
— RICHARD LAI & ZACH HONIG







Here's a funny one from the Tokyo Motor Show. Daihatsu's squarish concept EV van, dubbed the FC ShowCase, is basically a spacious four-seater packing plenty of goodies: a giant wing door, some blue lights on the wheels, an LED panel on the left skirt, side-view cameras instead of mirrors, a funky touch-panel steering wheel, a small heads-up display and a 60-inch TV. And no, this isn't a mod from *Pimp My Ride*. According to one of the designers, the idea here is that the FC ShowCase acts as a mobile theater, which can keep travellers entertained while camping or fishing. With the seats folded down (except for the driver's seat, of course) on top of the 35kW solid polymer fuel cell stack, this vehicle also makes a great delivery van apparently, but don't expect FedEx to turn up at your door with Daihatsu's dream ride any time soon. Or ever.





VIEW ON WEB

DAIHATSU PICO CONCEPT COMMUTER EV

— RICHARD LAI & ZACH HONIG







Using LEDs to display messages on the back of a car? Looks like we have yet another contender with the same idea, except this time, all four sides get an LED panel each. The idea behind Daihatsu's Pico concept EV is that it can interact with surrounding pedestrians and drivers, using messages with matching colors. For instance, the LED belt can issue a red warning on the back if a car is following too closely; or when driving past pedestrians in close proximity (think rascal scooters but with front and back seats), the belt can turn green and indicate that the car's limited to a safe top speed of 3.7mph.

Other than that, the Pico's very much just a cute little EV with a driving range of up to 31 miles (with a full two-hour charge), plus a top speed of 31mph. We also dig the touchscreen console inside the car, but with just the two LED bars acting as doors, we sure hope it'll withstand a bit of rain.





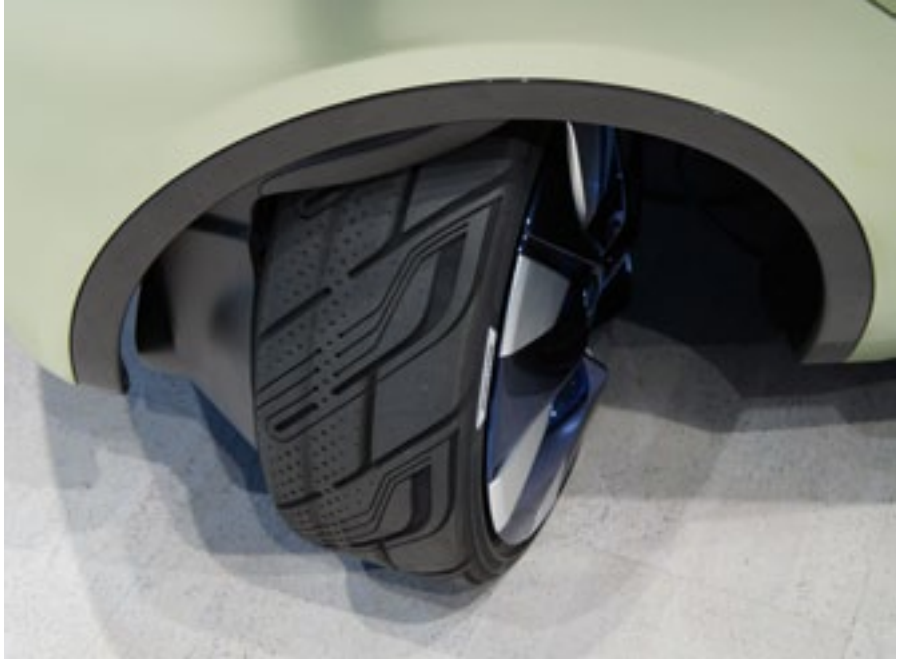
VIEW ON WEB

NISSAN PIVO 3 EXTREME AGILITY CONCEPT EV

— RICHARD LAI & ZACH HONIG







Nope, there's nothing wrong with those wheels. As you may recall, this is Nissan's Pivo 3, the company's latest concept EV that provides extreme agility using its four oddly pivoted, individually powered wheels. While we couldn't see this three-seater make sharp U-turns and do automatic parking at the Tokyo Motor Show, our very own Zach Honig managed to get his finger and trouser grease all over it.

Behind those pop-out doors, one of the most interesting features we saw was the subtle side-view cameras with accompanying screens that reduce the car's width. Also, it turns out the lone steering wheel handles all four wheels, meaning the driver won't have to sacrifice too much brain power over multiple controls. That said, we can imagine that even the most experienced drivers may find this car to be a tough animal to tame initially — the lady in Nissan's earlier demo looked like she had to steer dramatically around sharp corners. But keep the car going straight and it'll accelerate up to 120km/h (75mph), while on a single charge it can go up to 100km (62 miles).







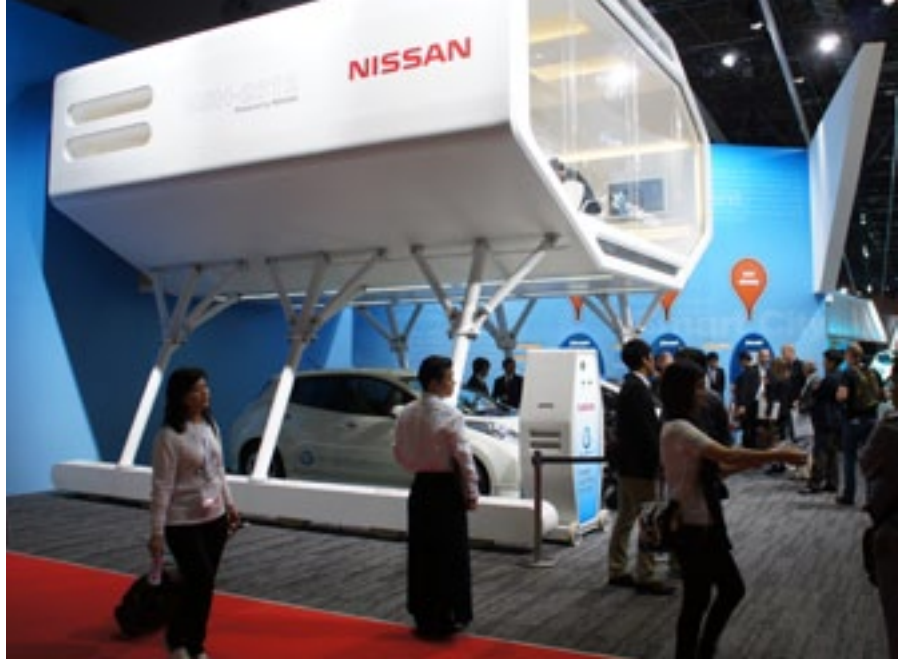
VIEW ON WEB

NISSAN DEMONSTRATES LEAF-POWERED SMART HOUSE

— RICHARD LAI & ZACH HONIG







Back in August, Nissan shared its vision of making its Leaf EV a secondary power source for houses, be it for emergency power outages or for powering lodges in the countryside. Here at the Tokyo Motor Show, we got to see a Smart House that demonstrates just that. To supply the electricity from the Leaf, Nissan uses a power control system box that can supply up to 6kW of power — plenty of juice for this structure, which consumes about 1 to 2kW for its lights, fan, TV, clock, mini fridge and air conditioner. As for battery life, a Leaf can keep a typical Japanese household powered for about two days, and customers can pick up this power control system around the end of March next year (the retail version will be about half the size of the one pictured). Nissan also said the Smart House can potentially supply excess electricity back to the grid, though this isn't yet possible in Japan due to the lack of such service, which is understandable given the natural disasters earlier this year.

Additionally, it turns out that the Smart House can also power itself during sunny days using its solar panels on the top, and any remaining electricity is used to charge up the Leaf; so effectively the car is acting as a mobile battery for the house. But what if it's cloudy and the Leaf is out and about? Well, the fuel cells inside the Smart House's belly will keep your party going, so there's really nothing to worry about as long as you keep an eye on your propane level.





VIEW ON WEB

TOYOTA FCV-R CONCEPT

Bringing fuel cell cars closer to reality, aiming for 2015 launch

— RICHARD LAI & ZACH HONIG







Amongst the many concept EVs we've seen at the Tokyo Motor Show, Toyota thinks that fuel cell vehicles still have a chance. Hence the cool-looking FCV-R, an actual functional hydrogen car featuring a multi-LCD panel dashboard along with a driving range of around 700km or 435 miles. Alas, interested buyers will have to wait until around 2015 before Toyota launches its first fuel cell car, which is currently projected to cost around $125,000. And of course, there's no saying whether hydrogen fuel stations will be widely available across the nation by then.



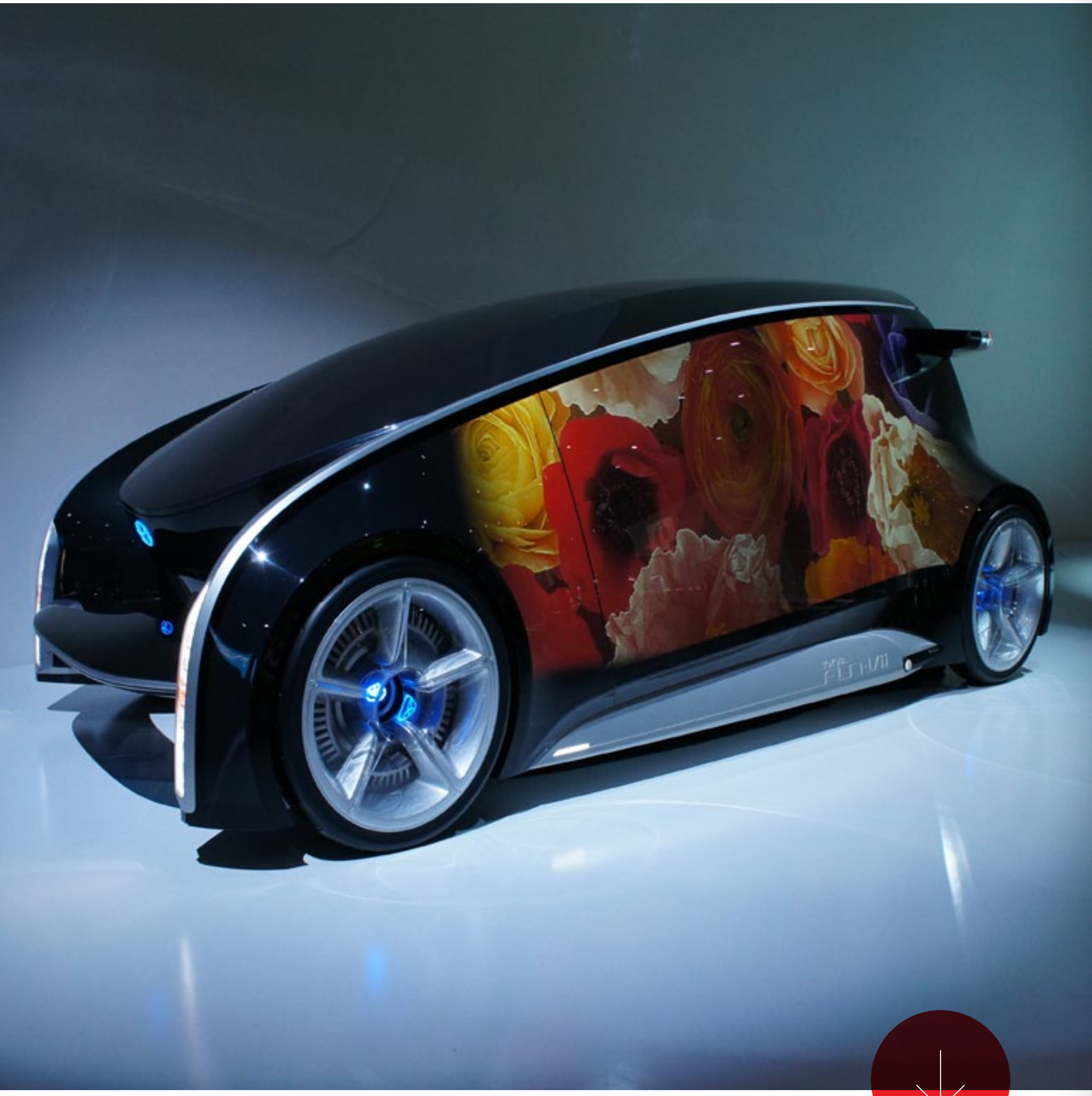


VIEW ON WEB

TOYOTA FUN-VII CONCEPT CAR

Envisions instantly customizable interior and exterior

— RICHARD LAI & ZACH HONIG

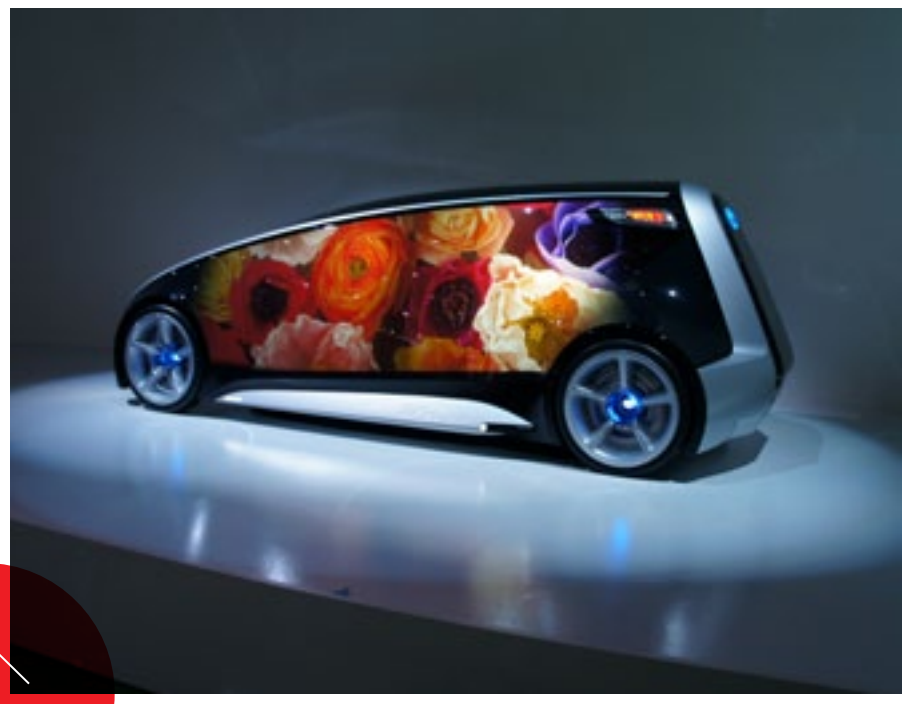






Look, the reality is that you can't drive your car into a Pay 'n' Spray every 15 minutes or so à la *Grand Theft Auto*, but what if you could simply change the vehicle's skin at the tap of a button? Toyota certainly likes the sound of that and has thus come up with the funky-looking Fun-Vii concept car. What's more, even the interior can be changed, and similarly, it can be used as a display space for navigation or even racing simulation (assuming the latter's disabled while actually driving, of course). This is all well and good, but unlike many other concept exhibits we've seen, Toyota's mockup couldn't seat people — we suspect the "car" only used a back projection from within, so we couldn't see what it'd feel like to play a Tron-like game inside the it. Nevertheless, we look forward to day when this idea becomes a reality — here's looking at you, flexible OLED!





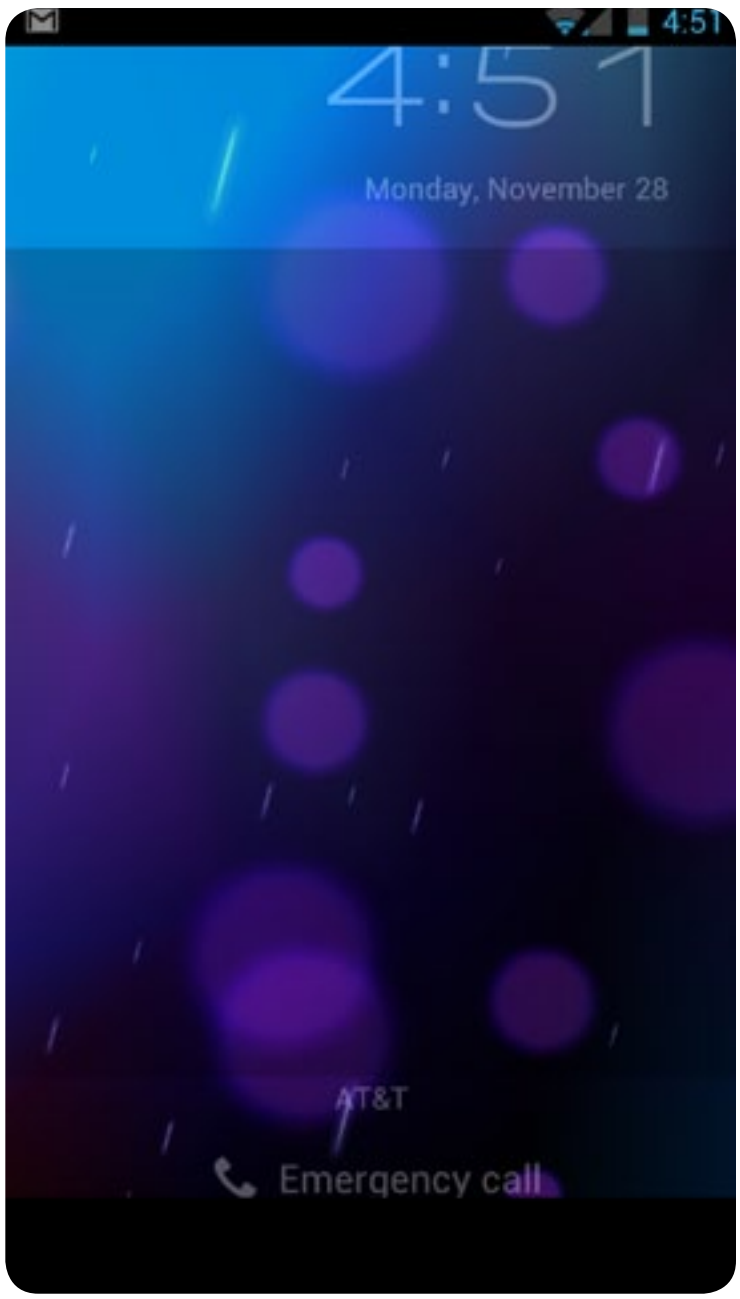
REVIEW

DISTRO
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Android 4.0 Ice Cream Sandwich

Ice Cream Sandwich is the largest and most attractive Android update we've seen so far, with a fresh UI and a litany of new features.

Photo: Christopher Rochelle



The next version of each smartphone's operating system is always the best. We impatiently wait for the latest and greatest firmware to come around, expecting it to liberate us from the shackles of last year's code and features that haven't shown up yet. This happens incessantly with Google's Android OS, and version 4.0 — unveiled at this year's I/O conference in May — is no different. Known as Ice Cream Sandwich (heretofore referred to as ICS), the last word in the title indicates the merging of Gingerbread, the most recent phone platform, and Honeycomb, the version optimized for use on tablets. We knew this much, but were otherwise left with conjecture as to how the company planned to accomplish such a feat — and what else the new iteration had in store.

But now the time of reckoning is upon us, and the Samsung Galaxy Nexus — Android 4.0's mother ship — is slowly spreading across the globe, its users being treated to this year's smartphone dessert. ICS is one of the largest and most important upgrades we've witnessed from Android since its humble beginnings, making a huge change in user experience as well as a massive number of bullet points on the list of features. Now that we've had the opportunity to take it for a spin, where does it stand in the ranks of mobile operating systems? Follow us beneath as we dig into the layers of this sweet sandwich.

On Skins and Stock ICS

In beginning our deep-dive of ICS, we'll be quick to point out that, much like the HTC-made Nexus One and the Samsung Nexus S preceding it, the Galaxy Nexus is running the pure vanilla and completely unskinned iteration of the OS it's ushering in. This means we're looking at ICS the way Google designed it, and not an OEM's interpretation such as on Samsung's TouchWiz, HTC's Sense or Motorola's not-so-Blur. Just



ICS is one of the largest and most important upgrades we've witnessed from Android since its humble beginnings.

as before, different skins lying on top of ICS are like having 31 flavors of ice cream: your experience with a Neapolitan-flavored sandwich may vary widely from one with Rocky Road inside.

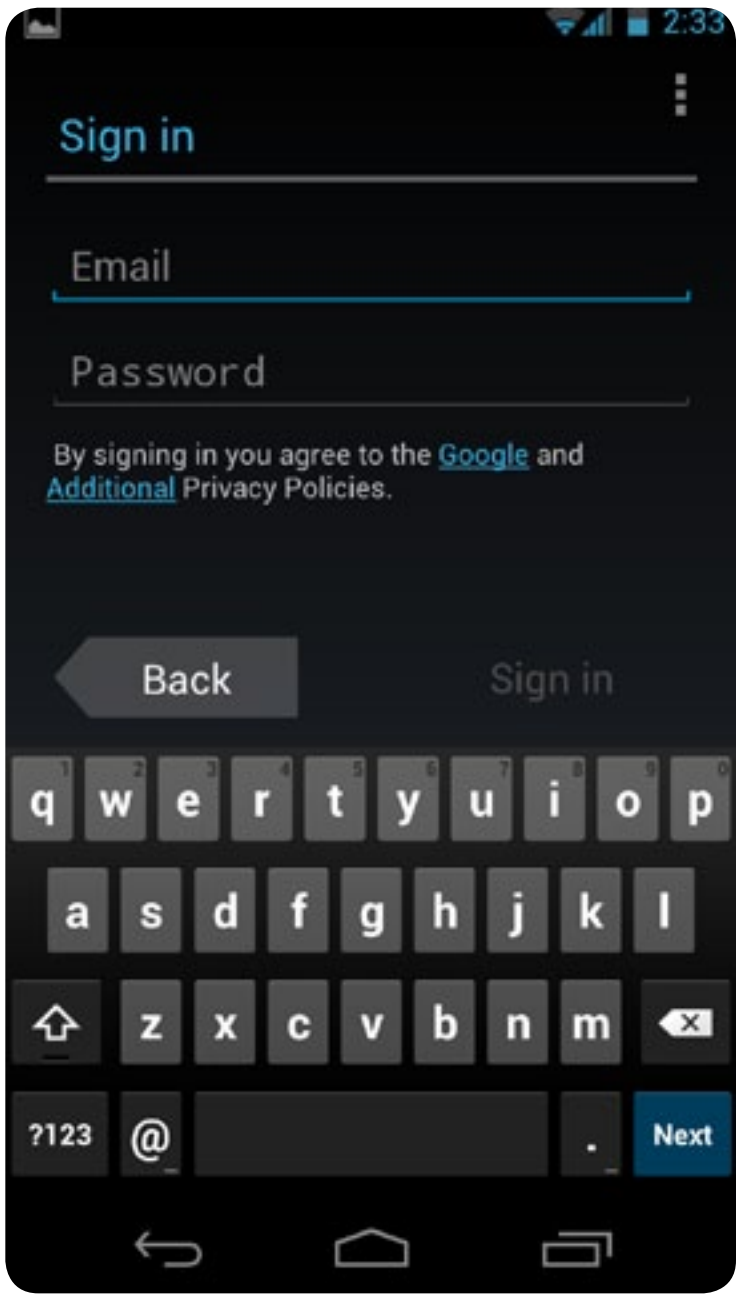
We won't pretend to know what changes these OEMs will make to the user experience, but rest assured that they'll be just as rampant as ever. While we're definitely fond of the improvements Google's made to ICS as a whole, it'll be intriguing to see how widely the interface differs from phone to phone.

Booting Up

Do you remember the last time you booted up a brand new Android device? It was a sweet moment, we'll bet, and the setup procedure remains largely unchanged, as you still have to either sign up for a Google account or throw in your existing login codes. New to the process, however, is the option to tie a Google+ account to your device as well and it lets you enter credit card information for Market purchases. You're also given the choice of watching a tuto-

rial meant to show you the ICS ropes. Whether you choose to view it or not, your phone's now good to go. The handset begins to sync in the background after you exit the bootup menus, a process that will take several minutes; we strongly recommend you connect your device to a WiFi network during setup, since ICS will hook you up with email, contacts, calendar entries, books, Picasa albums and Chrome bookmarks — all data-intensive activities that eat gigabytes for breakfast. Fortunately you can still dive right into the enjoyment of your new phone without having to wait until the syncing is all done. Just don't panic if Bob Johnson isn't in your list of contacts yet.

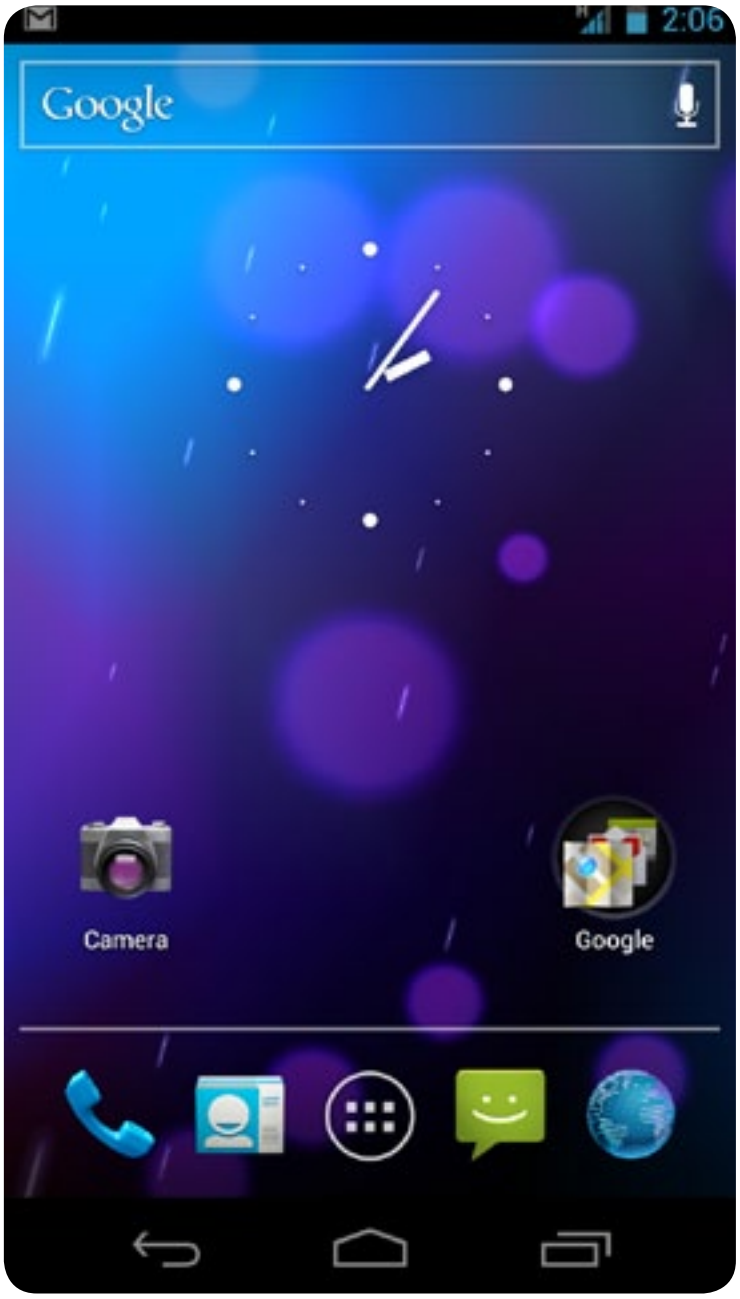
Here's a handy tip if you want to take advantage of ICS's accessibility features (discussed in more detail later): when you boot up the phone for the first time and reach the Getting Started page, put your finger on the top left corner of the screen and draw a clockwise square. Doing so will activate all of the accessibility features and take you directly into a tutorial on how to use them.

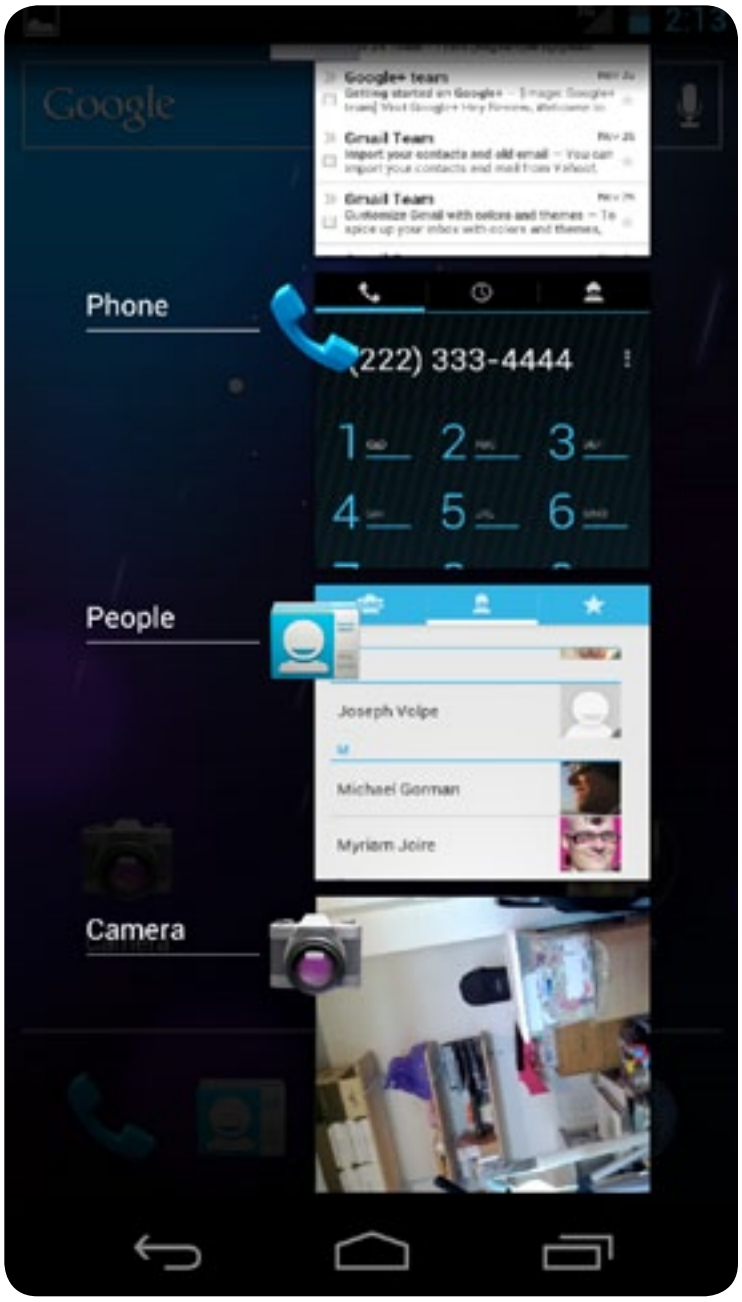


User Interface

The good news: the user interface has been improved on ICS, with a litany of new elements geared to make it significantly better. Still, whether or not you're coming from an Android background, there's going to be a learning curve. That doesn't seem like such a terrible prospect, but our geek dreams of an OS without the need for proprietary OEM skins won't get any closer to becoming a reality — on the contrary, we'll likely see plenty of tweaks made by vendors in attempt to "enhance" the user experience.

One of the first things you'll notice when making the journey to ICS is the color scheme. Gone is the lime green-on-black theme present on Gingerbread, and in its place comes a subtle light blue-on-gray motif. There are five home panels at your disposal, and there's no option to add or take away screens. Along the bottom is a "favorites tray" capable of holding up to four shortcuts — besides the standard app tray button, of course — doubling the previous version's layout of two (phone



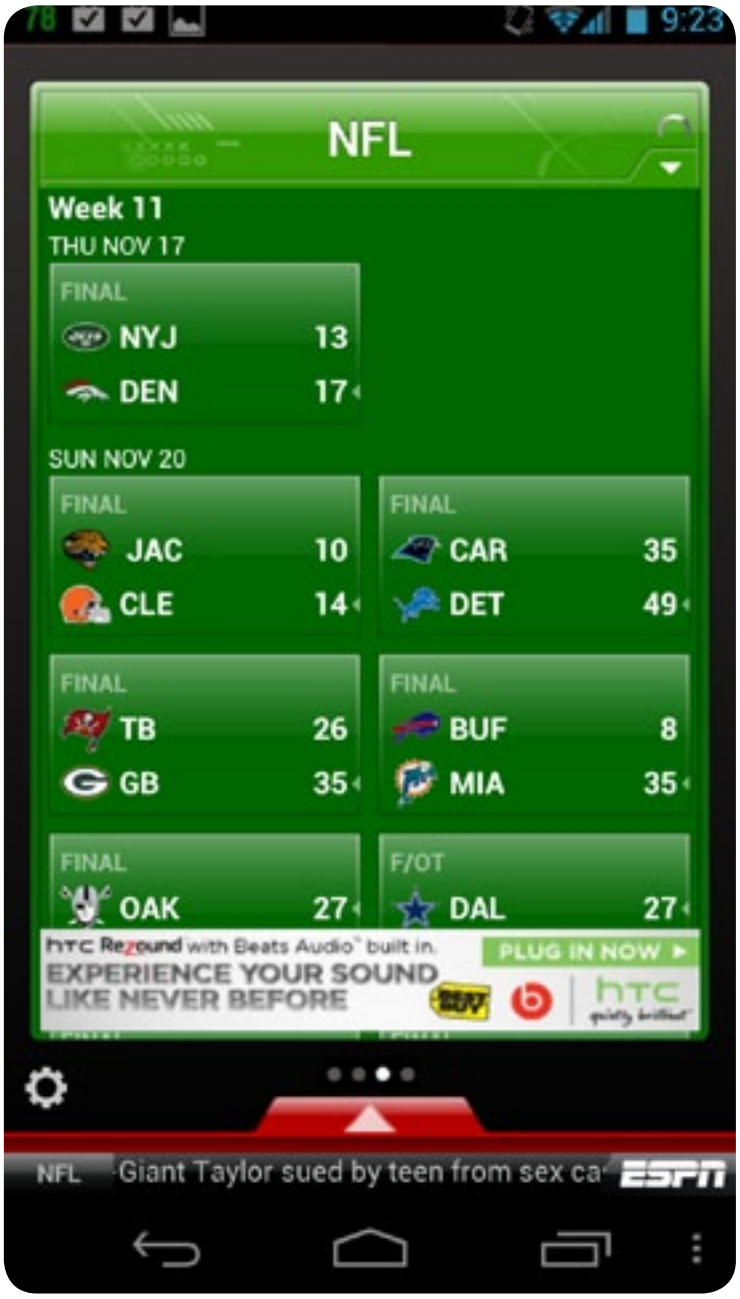


and browser). And while stock Gingerbread wouldn't allow those icons to be swapped, ICS does — heck, you can even put folders here or just get rid of all of the apps altogether. The fact is, you're now given the *choice*, something we deeply appreciate.

You'll notice that a long-press of the home screen still brings up a menu, but it's only associated with wallpapers now. No longer will you find access to widgets, folders and shortcuts here; widgets and shortcuts are now located in the same space as the app tray, and folders can be created easily without the long press.

While we're on the subject, folders have definitely graduated in design, transforming from ugly manila covers to transparent circles showing your apps inside, piled on top of one another. In fact, it almost has a look reminiscent of — dare we say — iOS. Sure, there's the obvious difference in shape, but all it takes to create a new folder is the act of dragging one icon on top of another. Once established, it's easy to rename your new creation.

The app tray's definitely grown and matured to sport a Honeycomb-style look and feel. Instead of one continuous panel that you navigate by scrolling up and down, the menu actually consists of multiple panels that you navigate by swiping left and right (a la TouchWiz). The widgets galleries can be accessed by touching the tab at the top of the screen,





or by swiping the panels from right to left until you get there. Several widgets are now resizable — a feature present in Honeycomb but not in anything 2.x or earlier — and can be adjusted dynamically as soon as they begin taking up real estate on your screen.

Another welcome addition to the ICS scene is the row of virtual navigation buttons on the bottom: back, home and task switcher. The menu button — mandatory to all pre-ICS phones — is completely gone, as is the search (a moot point, given the standard Google search bar on the top of each home panel as well as search options in most apps). We doubt that they'll be missing from every ICS-enabled device, though; in fact, we'd be more shocked if we *didn't* see a virtual search button pop up on a proprietary skin rather than the other way around. We're also curious to see how the menu button on legacy devices (that is, phones upgrading from Gingerbread that still utilize hardware or capacitive keys) will be applied to ICS, however, because the stock OS is designed to work specifically without that button getting involved. Ultimately, we can see the direction Google's heading here with these new soft keys: offering virtual buttons will allow for larger displays and minimize the number of physical keys lining the outside of the phone, and we get the sense that the company envisions a future with none whatsoever.



Android's made it a point to include several core apps in each edition of its firmware and ICS is no exception.

Unlike previous versions of Android, soft keys on the stock OS don't offer long-press shortcuts. The task switcher, once accessed by holding down the home button, now shares an equal amount of real estate on the bottom row of virtual keys. A quick press of the switcher brings up a vertical list of all of your running programs, displayed in a way that will make Honeycomb users giddy. Each app on the list can be individually removed by simply swiping it to the left or right, but now's the perfect time to offer a disclaimer: this isn't a guaranteed task killer. Some running programs close completely, but a majority of those that have background network access won't actually be shut off by simply swiping them away. The only way you can be absolutely positive that your app's no longer running behind the scenes is to go into the Apps section of your Settings menu and manually stopping the process.

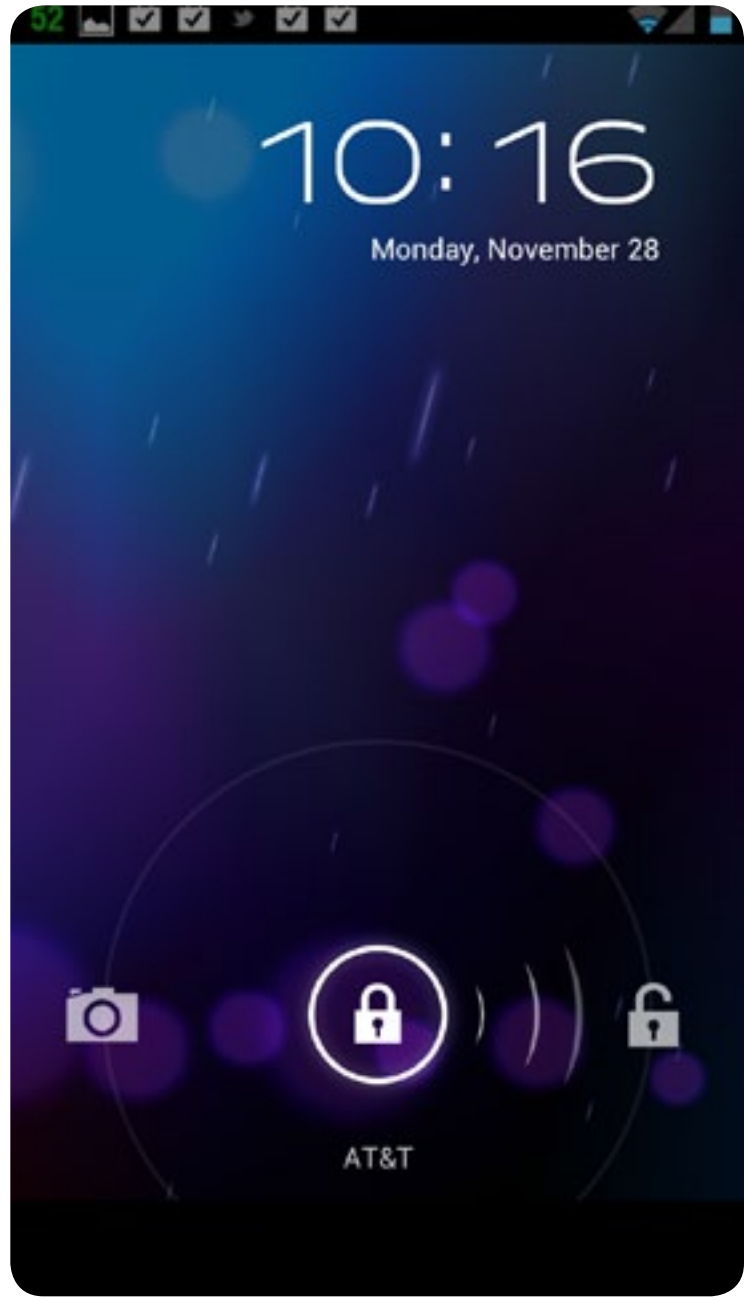
The notification bar also got a facelift. It's still accessed the same way as before — sliding your finger down from the top — but you can also reach it on the phone's lock screen if you prefer (more on that later). Much to our satisfaction, we were happy to see that rather than only being able to clear all of our notifications in one fell swoop, most of them can be swept away one by one with a flick of the finger to the left or right; you can still clear them all out at the same

time, however, by hitting the “x” in the top right corner.

Oh, and what about easy access to the settings menu? The notification bar’s got it at the very top. It’s an obscure icon and easy to miss if you don’t know what you’re looking for, but after we got used to its new location and look, we discovered it was much easier to get to settings now because we could reach it from any app we wanted to, rather than having to jump out of the app first.

Lock Screen

By now, you’re probably starting to get a full sense of the scope of how much Android’s UI has actually changed, and it certainly doesn’t stop there. Even the lock screen saw a remodeling, and it’s definitely for the better. Upon first glance you’ll find the date and time laid out in Roboto, ICS’s new signature font (an incredibly clean-looking one at that), with a simple lock icon near the bottom. You can slide the lock to the left or right — right taking you into the standard home screen, and left taking you directly to the camera (which lends additional aid to Google’s goal of taking a picture on a moment’s notice, given the camera’s professed lack of shutter lag). Slide your finger down from the top and the notification menu pops out — and yes, you can access all of those notifications directly from the lock screen, which means you’re able to



check emails, voicemail messages and anything else within seconds of turning your phone back on.

If extra security is what you need, ICS still offers you the usual suspects of PIN and pattern lock, though you sacrifice direct access to the camera and notification bar. But Google threw a unique technological nugget into its latest OS in Face Unlock, which theoretically cranks the security knob on your phone up to eleven.

Face Unlock

It’s pretty easy to forget all about every other feature or UI enhancement in ICS considering the amount of buzz being

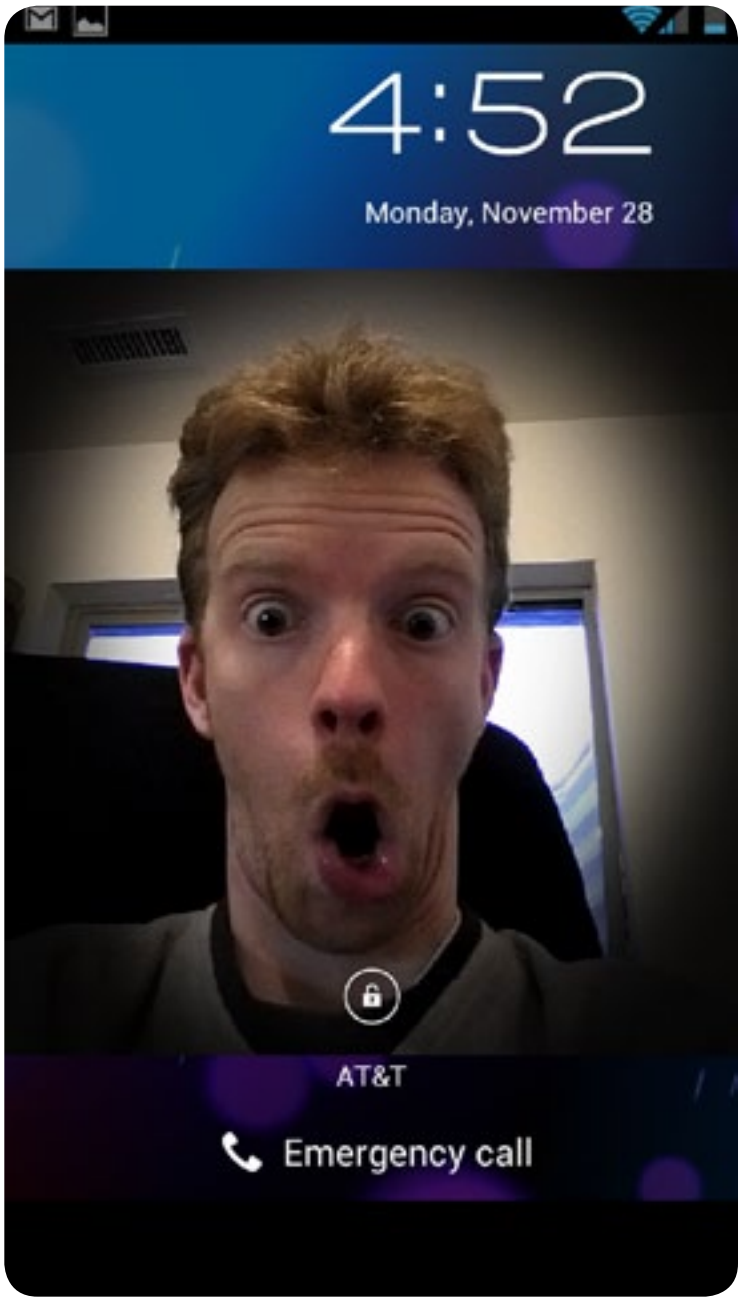
generated by Face Unlock. We'll admit, we were pretty enticed by the feature as well at first, but let's not kid ourselves here: it's a gimmick. Clever, sure, but it's not as secure as you might think it is.

Here's how it works: go to the security settings, select screen lock and choose "face unlock." The camera then memorizes your face — or at least, the shape of it — and asks you to submit a PIN code or pattern lock just in case it doesn't recognize you, which honestly happens more than we'd like. In fact, we saw both extremes: our faces typically weren't recognized if we angled our head slightly away from the camera or if we tried to unlock the phone in low light, but the phone easily recognized our face in the mirror and when wearing glasses. Even worse, we were able to gain access to the phone simply by holding our picture up to the camera.

Face Unlock still needs some tweaking before it's ready for primetime, but the feature is still a clever gimmick that you can show off to your friends — provided you're in a room with adequate lighting, that is. From a software perspective, we believe the technology will gradually get smarter and catch up to various PC facial recognition programs, but for now we'd recommend a good old-fashioned password to keep your sensitive information away from everyone else.

Core Apps

Android's made it a point to include several core apps in each edition of its firmware, and ICS is no exception.



These apps, which comprise of what many consider to be the absolute essentials, can be found in the revamped app tray — and for easier access, you'll notice a "Google" folder on the main home screen panel that includes a healthy portion of apps offering Mountain View's services.

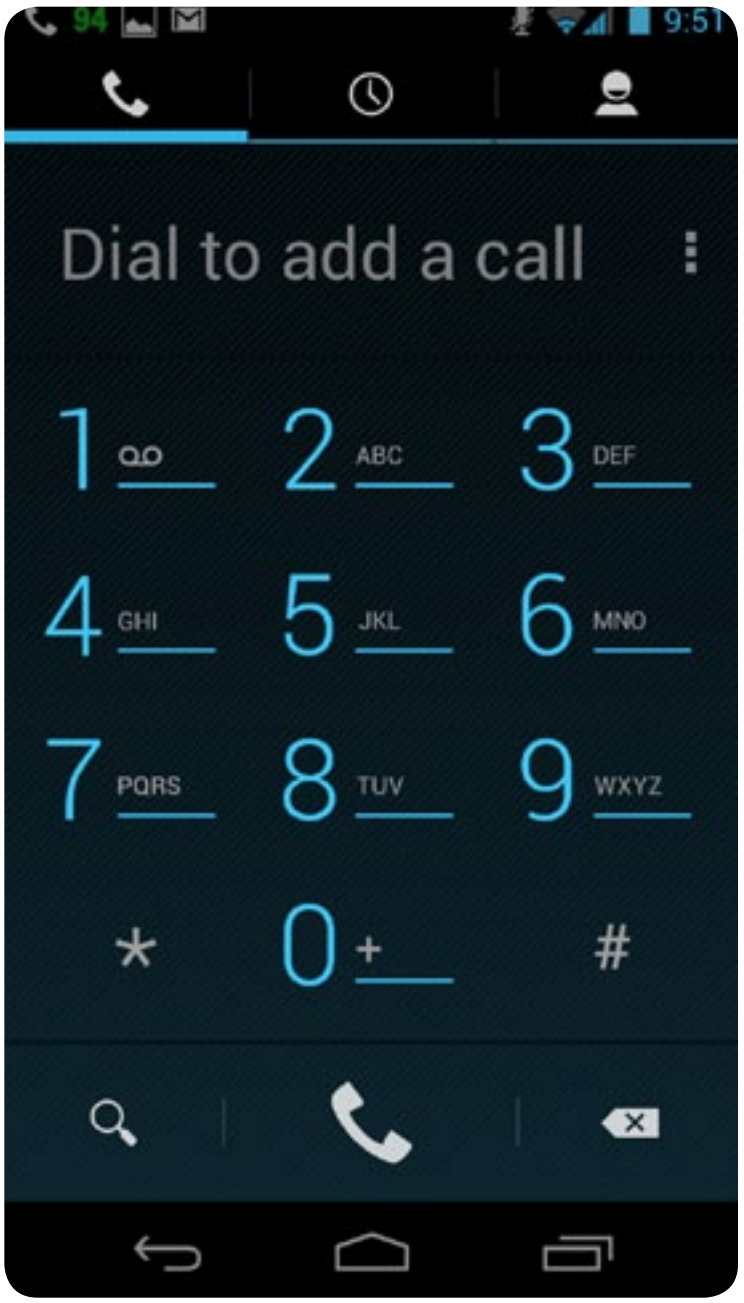
Many of ICS's core apps have evolved from their previous iterations, allowing these programs to have complete synergy with the new user interface. No doubt they look and feel like they belong right at home on Android 4.0, and let's not forget about the extra functionality they bring to the table. Here's how each core app was enhanced with Ice Cream Sandwich.

Phone

Yeah, it has a dialpad and you can push numbers and make it call people. But what else can you do in the phone app? The first and foremost improvement is called “quick response,” which allows you to reject an incoming call and fire back a text message letting the caller know that you’re otherwise predisposed. Four different messages are allowed, and you can stick with the preset list of message options or swap them out with your own custom ones.

The phone app itself has also received an ICS makeover, with smooth black and blue tones throughout, simplistic icon-based tabs on the top bar along with search and options on the bottom. Moving between tabs is now just a matter of swiping right or left. The contact tab now offers a unified listing, integrating all of your social networks and Google services (such as Gmail and Google+) into one crazy mix. Fortunately, ICS gives you the chance to be picky and opt out of specific services you don’t care to add into the list. High-res photos are also now allowed in the contacts tab, which means that you have a large and high-quality image of your friend or family member getting all up in your face when they call you.

Then there’s the People app, which also offers a unified landing spot for all of your friends, family and acquaintances, but also adds a little more pizzazz than its phone app counterpart: you’ll see the latest status update from your social-savvy associates. Not only that, clicking

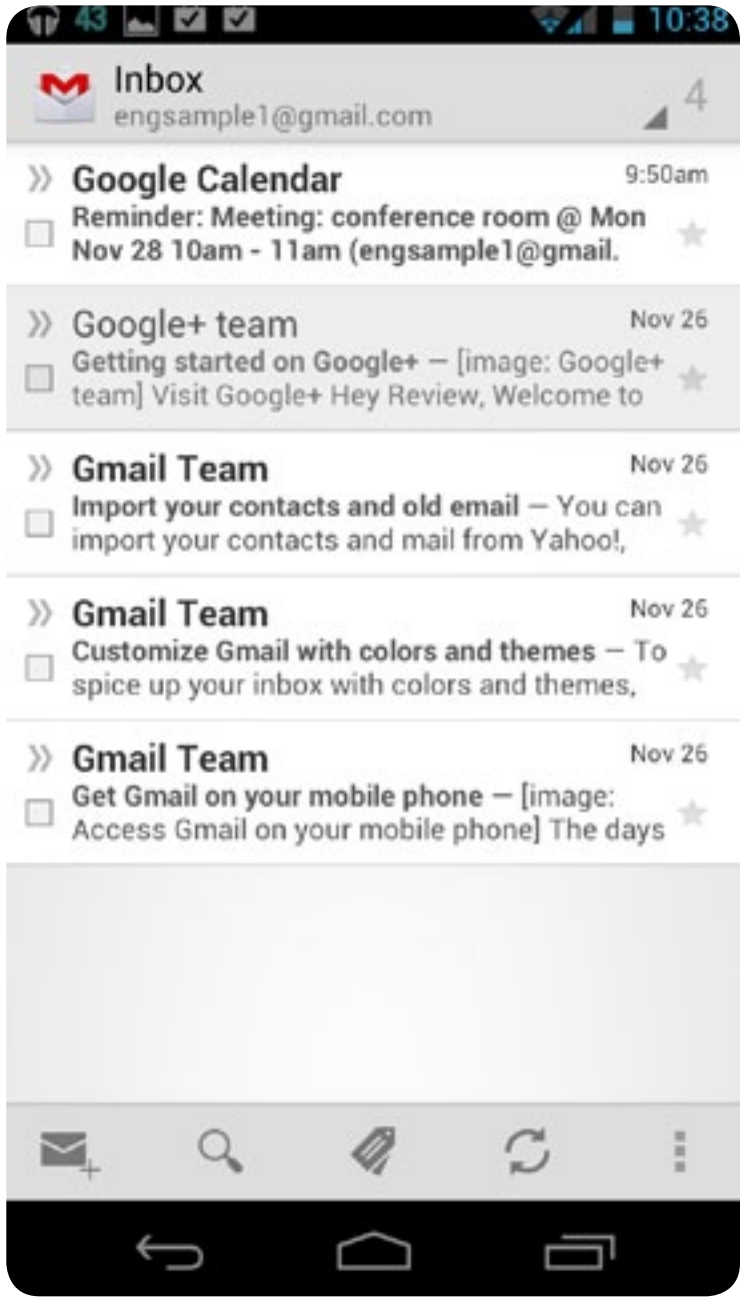


on the person’s name will bring you into a contact card with multiple panels that looks an awful lot like Windows Phone. The first screen shows all of the person’s connection information — complete with links to their social networking profiles — and the second one displays a list of their most recent statuses. This makes for a well-rounded contacts app, for sure, but there’s just one small oddity about it all: Ice Cream Sandwich currently lacks the ability to merge or link Facebook contacts (more on this later).

Gmail

Liked Gmail on your Gingerbread device before? It was pretty good, but we have





a hunch that you'll love it even more now. For one, you can actually create new messages without having to press an options key. In fact, most of Gmail's most used features have been brought forward to the app's forefront in ICS.

In the inbox you'll see an extra line of text for each email, showing off the first few words. This is an improvement over Gingerbread's version, which merely shows the subject and sender, leaving the actual body of the message as much of a surprise as a birthday present. When you get into the individual email, you're given plenty of options, such as assigning labels, replying, marking it as an important message (or spam, for that matter), marking as unread and archiving / deleting the email. When you're ready to read the next message, all you have to do is swipe to the left or right to move along to another email conversation.

Also included in ICS is the opportunity to read your Gmail when you're offline. By default the phone will sync email from the last 30 days, but the amount of time you prefer can easily be customized. This is ever-so handy for catching up on your email when you're in Airplane Mode or just simply not within range of a tower. We also noticed that messages had very little lag when loading. The only thing we were disappointed in was the app's lack of pinch-to-zoom support for images — odd, since



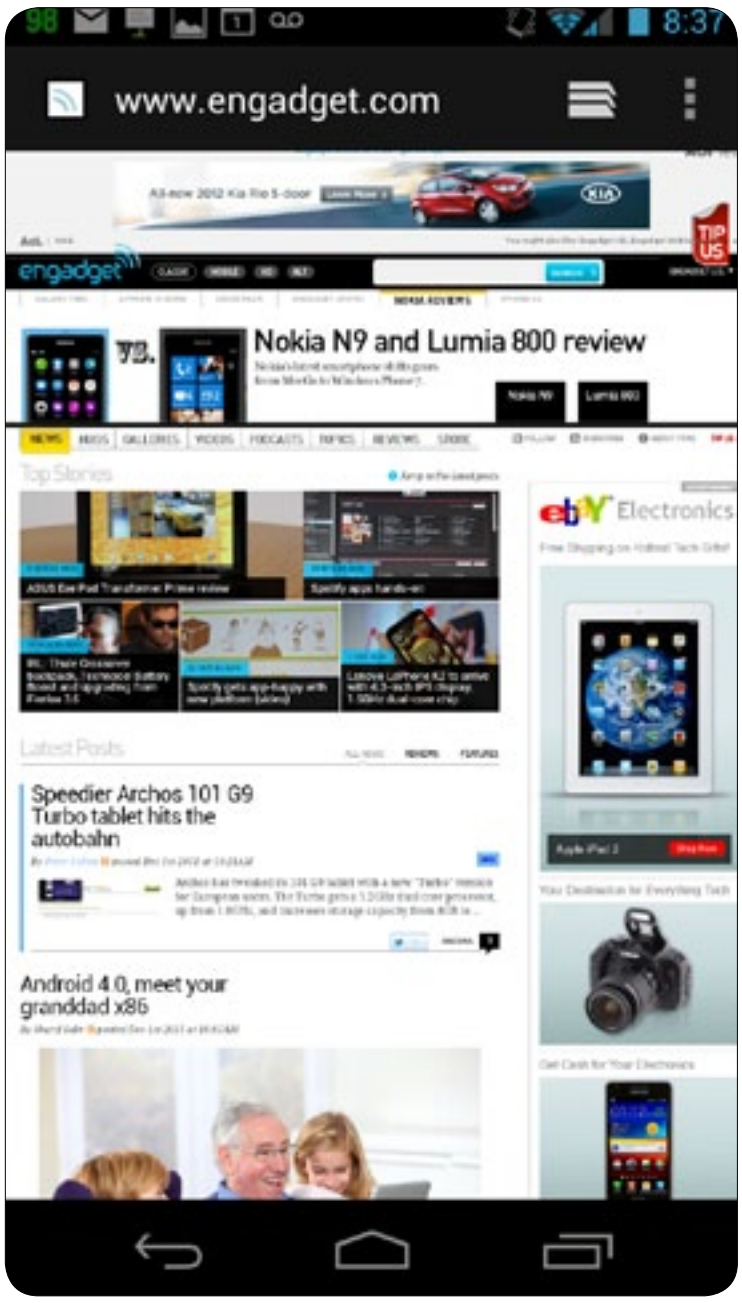
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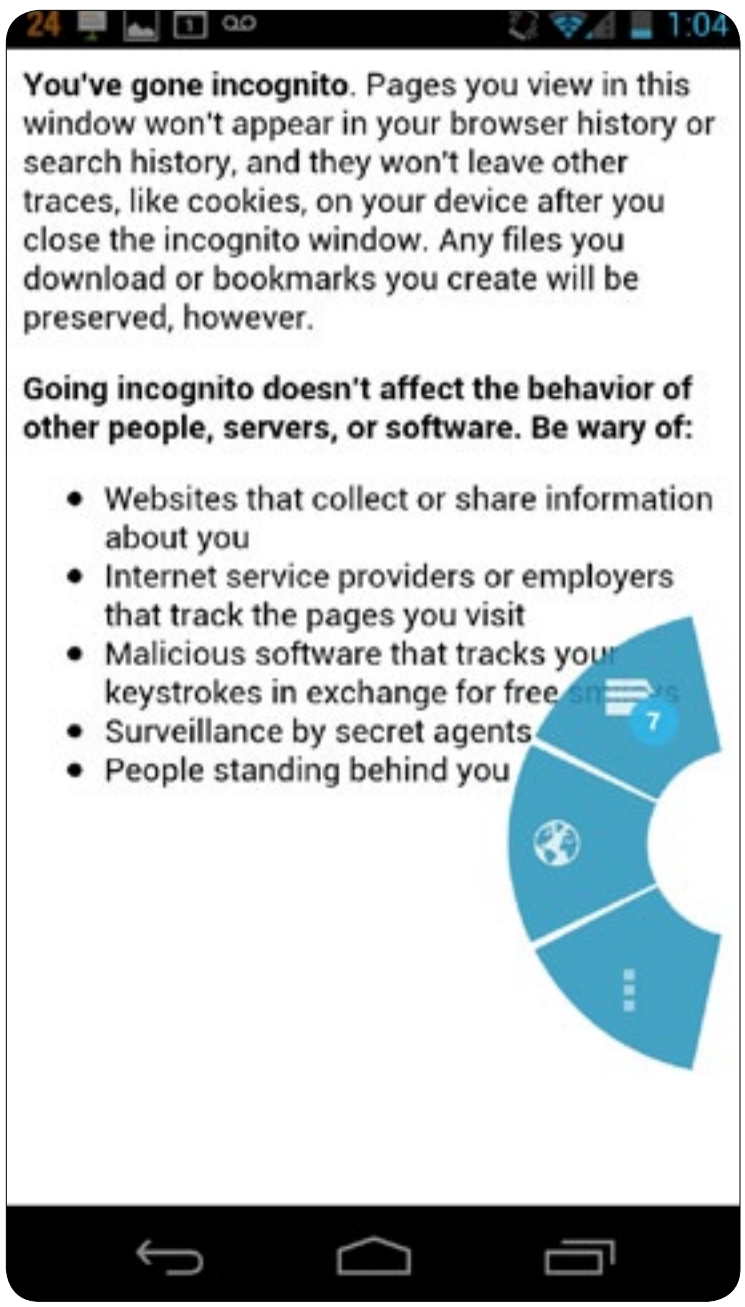
the functionality was added to the new calendar. Aside from this, however, we enjoyed the improvements made in ICS and will find it difficult to review Gingerbread handsets after playing with the new firmware and seeing what it's capable of.

Browser

It's hard to know where to begin with the browser, as so many features and elements of its performance were affected by the upgrade. Besides the temporary omission of mobile Flash (which we'll discuss in more detail later), we had a hard time finding something to dislike. First, the ICS browser has certainly sped up; while benchmarks aren't a tremendous indicator of real-life performance, we were still quite happy to see SunSpider 0.9.1 bring up a time of 1,850ms. To offer perspective, the Samsung Galaxy S II, another well-oiled machine with hefty *oomph* underneath the hood, rarely dips down below 3,000. The Acid3 test on the Galaxy Nexus also scored a perfect 100 / 100.

Google's also added the ability to save



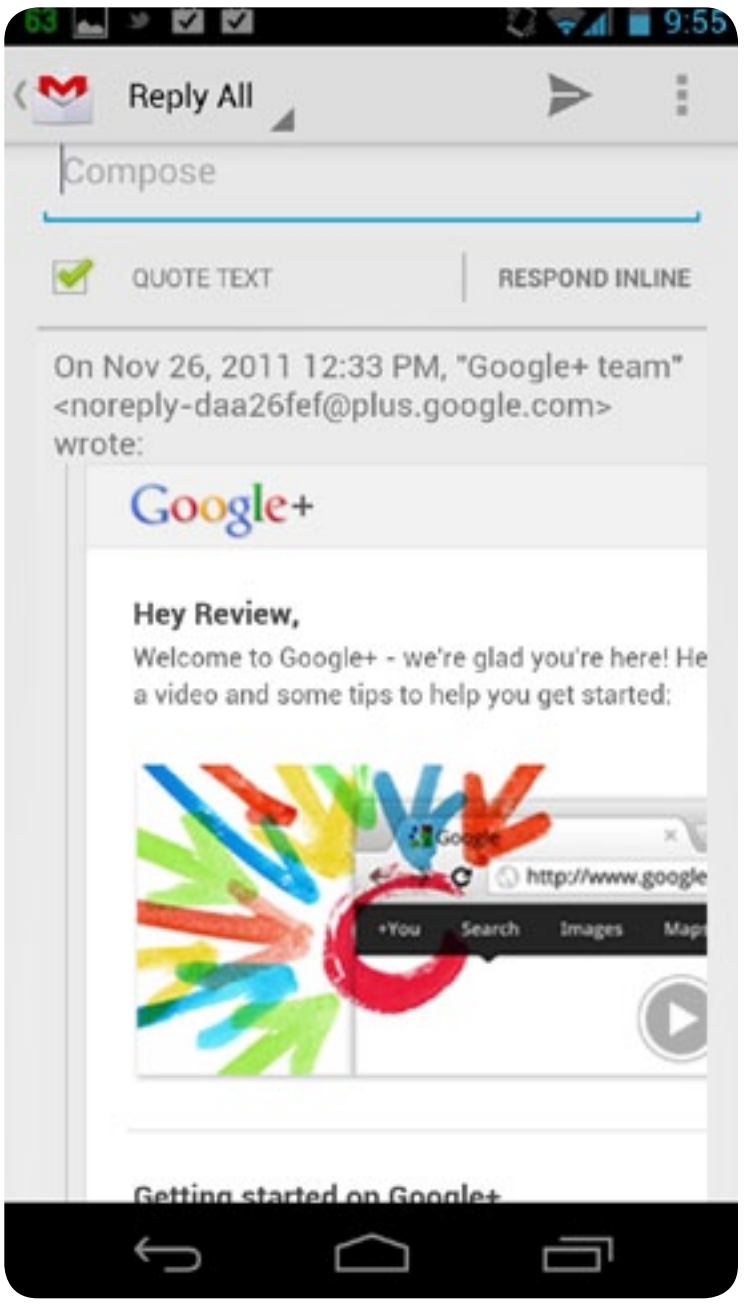


webpages to read whenever you lack an internet connection — like a native version of Instapaper — for those times when the train goes through a tunnel or you want to do some reading mid-flight. Sadly, there's no way to specify exactly how many links are cached, but we can live with that. Chrome bookmarks are now synced with the ICS browser as well, and you can also take advantage of a home-brewed incognito mode when you don't want to show your browsing history.

Another new feature in the browser is an option to request the desktop version of sites; we find this concern often when navigating to Engadget, since we normally have to scroll all the way to the bottom of our mobile site to switch over to the desktop flavor. Having our browser do this automatically makes for a much faster and more enjoyable experience while surfing the net.

Lastly, check out the Labs option in the browser settings, where you'll discover a clever UI element that's not thrown into the browser by default. When enabled, you can pull up a three-button menu by swiping your finger from the left or right edge of the screen. This semi-circular menu gives you fast access to your open browser tabs (by the way, you can now have 16 open simultaneously), settings and the hidden URL bar at the top. Tra-

ditional Android users may not prefer it, but we found ourselves quickly growing attached to this new method of navigating around the browser.



Calendar

WebOS may be having some rather tough times lately — to put it mildly — but Android 4.0 has borrowed some great design elements from its calendar (given Matias Duarte's heritage, should we be surprised?). The ICS datebook now supports pinch-to-zoom capability, which lets you expand or compress your appointments and helps you navigate to specific time slots more easily, and it also offers color coding to differentiate between your various calendars. You can also flip between view types: day, week, month and agenda can all be viewed.

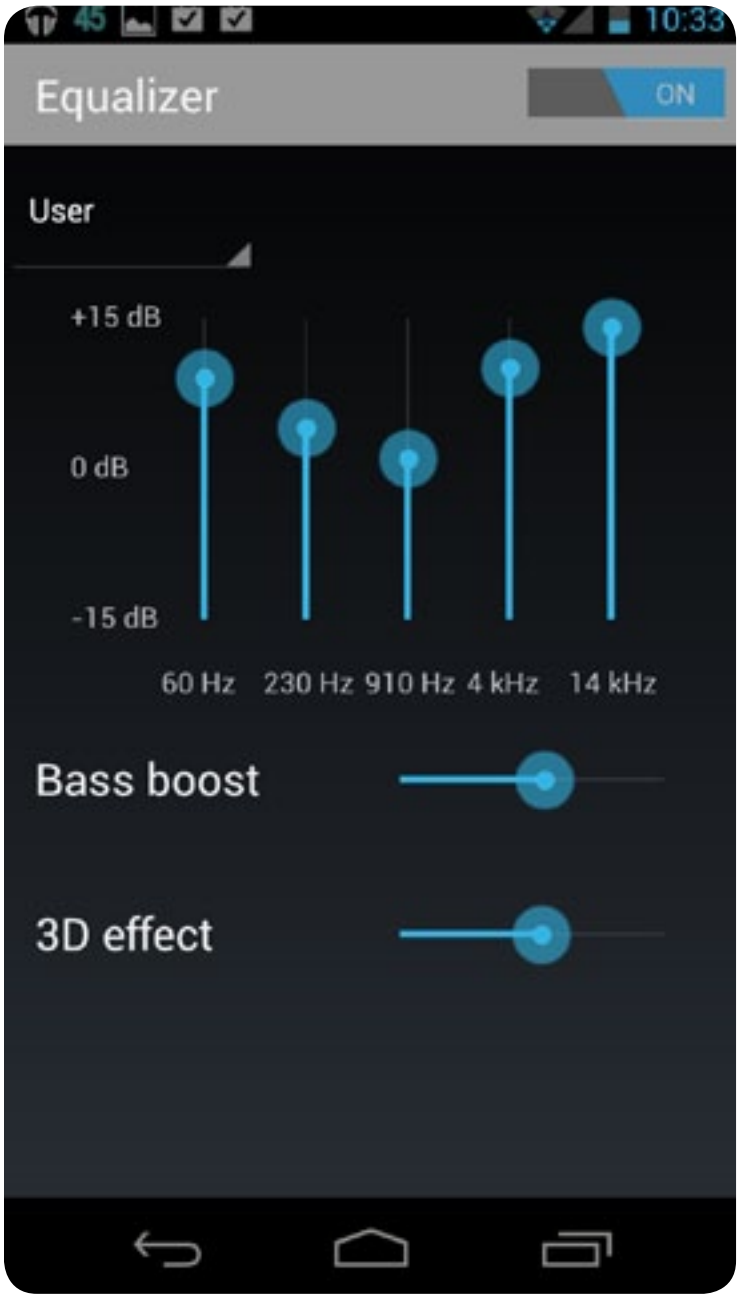
Google+

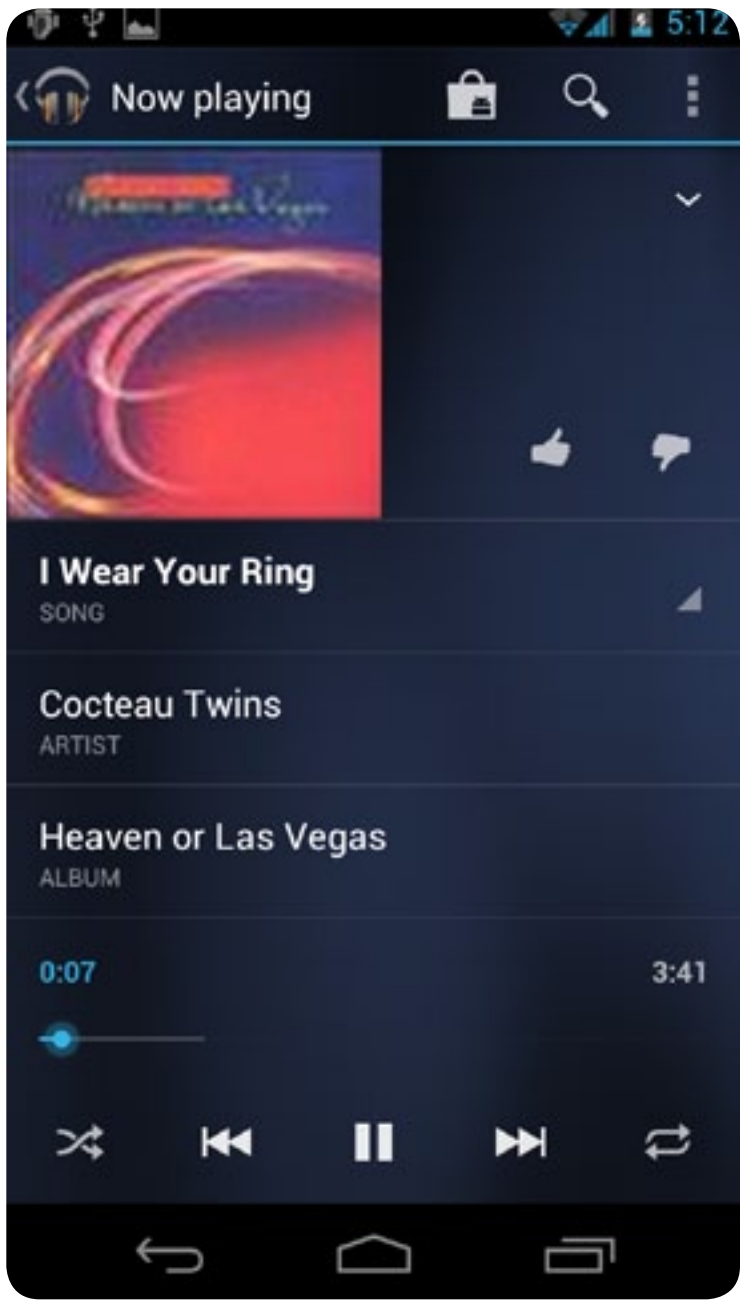
Hangouts. In ICS's version of Google+, you're now able to join hangouts — a feature we've always felt was wrongly missing from the app. The ten-person limit applies here, but you'll be able to do video group chats with your friends or associates. Keep in mind, however, that just because you can join 'em doesn't mean you can create 'em. Perhaps that's a bullet point on the list of features that just didn't make the cut in time.

As mentioned earlier, Google's definitely plugging its social networking service into more nooks and crannies on the OS by prompting you to sync your Google+ account from the start, infusing status updates with the People app, integrating it into image sharing (as well as several other sharing options scattered throughout the OS) and offering new widgets for the home panels. The company's determined to make its new service work, and we can't think of a better way to do that than expose the heck out of it to millions of Android users.

Talk

We'd mention that the Google Talk app has a completely new design to fit with ICS, but let's face it — nearly every native app on the new version of Android has been revamped, so this isn't any new revelation by any stretch of the imagination. Aside from UI, however, ICS





has spiced up Talk's video chat service by adding image stabilization as well as a few fun (read: pointless) live visual effects that we'll cover in slightly more detail in the camera section.

Music Player

The music app in 4.0 brings an equalizer, 3D surround and bass boost effects. We were also told by Google that the player is designed to be faster in ICS, though we didn't necessarily see a noticeable difference overall.

Keyboard and Text Input

Google didn't let the keyboard off the hook in this update, and we're excited about it. The 'board itself looks quite similar, but there's a lot more horsepower pulling the wagon. ICS adds spell checking, in which a red underline indicates a misspelled word and gives you suggestions on replacements. It delivers an improved autocorrect — which shows several possible word ideas in a brand new row above the keyboard — and prediction, which tries to guess the words you're trying to type as you go along, and detects double-typed words, letters or spaces you left out as well as other various errors. Double-tapping a word highlights it and brings up a "replace" option that offers suggestions from the dictionary. You can still add



The voice recognition service has improved over Gingerbread's offering, but we still had to exercise a fair amount of patience.

your own words to the phone's dictionary, and even better, third-party spell checkers and dictionaries are now supported in ICS. Our relationship with the stock Android keyboard has always been hit-or-miss up to this point, but the latest revision is certainly making us a believer. We found that the new autocorrect functionality allowed us to type faster and with greater confidence. As before, you can also utilize voice recognition to type for you. But this time around, Mountain View's boasting some tremendous server power to back up its input engine; ICS offers continuous voice recognition, which means that the mic is continually listening for your voice and will update your message as you talk. Previously, you had to wait until your sentence was completely done before the engine stopped to process your statement and push out what it thought you said. We also discovered that the new Android is also able

to understand punctuation, which was a very exciting prospect to us: instead of having to insert question marks and commas manually (defeating the purpose of using voice dictation services), we could just say the word "comma." To our delight, the program even dictated smiley face emoticons. The voice recognition service has improved over Gingerbread's offering, but we still had to exercise a fair amount of patience — it's far from perfect, as it still occasionally missed words that we stated loud and clear, and contractions didn't always come through as we expected. Last (but certainly not least), since voice input is largely controlled on Google's side, a solid data connection is a must in order to fully take advantage of the service. No internet at all where you're at? Sorry, the voice recognition doesn't work at all and the dedicated icon on the keyboard is greyed out.

CAMERA, GALLERIES AND MEDIA EDITORS

Camera / Camcorder UI

It won't take a very long time for stock Gingerbread users to become accustomed to ICS's camera, as the look and feel has largely remained untouched. There are, however, several key differences that will make you glad to jump to 4.0.

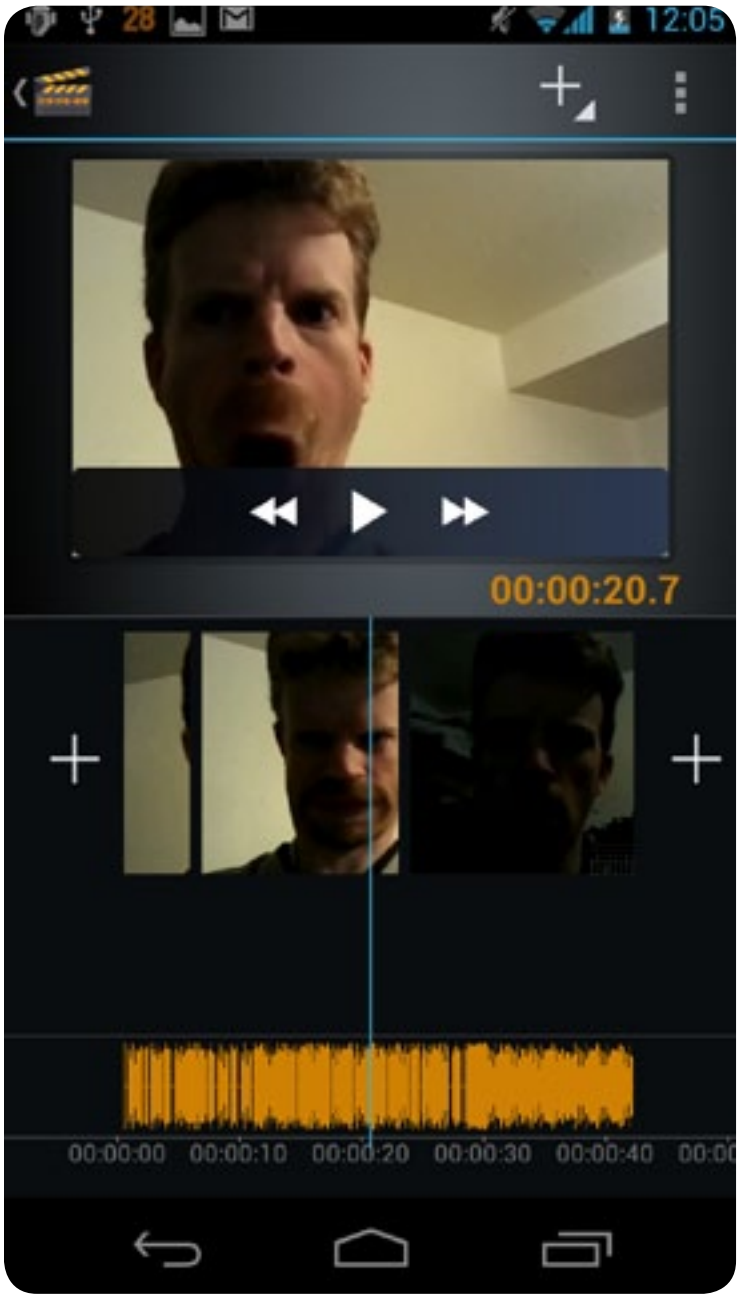
The most heavily advertised feature of the new camera is its lack of shutter lag, and it really does work — as long as you don't want to autofocus first. While a quick press of the shutter button generates an image in virtually no time at all, it's not guaranteed to be in focus unless you actually give it a second or two to do the job. Speaking of which, tap-to-focus and face recognition are both in full swing with ICS.

Other new additions to the camera include a zoom slide bar on the right — this replaces the standard set of options found in Android 2.3, though a press of the settings key will slide the zoom away to make room for them — and panorama mode, accessible by pressing the toggle in the bottom right corner. Once you activate panorama, you just need to press the shutter button, pan your phone left or right, and hit the shutter again once you're done. Presto, your images are getting stitched together.

When switching over to the camcorder (also accessed using the same toggle in the lower right corner), you'll have a few new items of interest to play around with. The first one is the set of visual effects that can be added to your recording as it happens. These effects either involve distorting faces (such as buggy eyes, squeezed faces or abnormally large mouths) or throwing in a background picture behind the person you're shooting video of — similar to what you'd see on a green screen. Also new is a time-lapse option.

Galleries and Photo Editor

Along with a redesign, photo galleries now come included with a homegrown





editor. You can easily crop images, add effects and filters, rotate and flip. Fortunately, the newly-edited images won't overwrite the originals when you save them. Screenshots taken with your phone can be edited as well.

Movie Studio

Honeycomb's Movie Studio has migrated to ICS, and much like its counterpart, it's ideally suited for creating fun little video clips rather than turning into a mobile substitute to your computer's movie editor. You can combine videos together, shorten or lengthen each individual clip, and top it off with a music track of your choice. It's simple, but not laden with features. As phones become more powerful, we'd like to see the number of editing tools increase, effectively turning our Android devices into fully functional movie-making machines.

Android Beam

Ah, the term just sounds so futuristic, doesn't it? In our heads, we associate it with Scotty from Star Trek or sharks with laser beams. Either way, Google's dead-set on bringing the future closer to our grasp by delivering NFC capabilities to the mainstream crowd, and we can't think of any better method of doing so than by loading it onto each and every one of the 500,000 Android devices activated every day. Don't get us wrong:

NFC is not a stranger to the OS (Google Wallet and Tags are already offered), but its functionality is still somewhat limited and unknown. Android Beam, introduced in ICS, wants to slap the general public in the face with a large helping of the technology.

Beam gives ICS users the opportunity to share apps, URLs, videos, contacts and directions — not to mention anything third-party developers can dream up, since they have access to the API — with another user's NFC-enabled device. Here's an example of how simple the process is: find the content or information you want to share, put your handset back-to-back with somebody else's, and Beam will prompt you to touch the screen to initiate the data transfer. Contrary to all of our experience with science fiction TV shows and movies, however, the beam doesn't make a *pew pew* sound when transferring information from one phone to another.

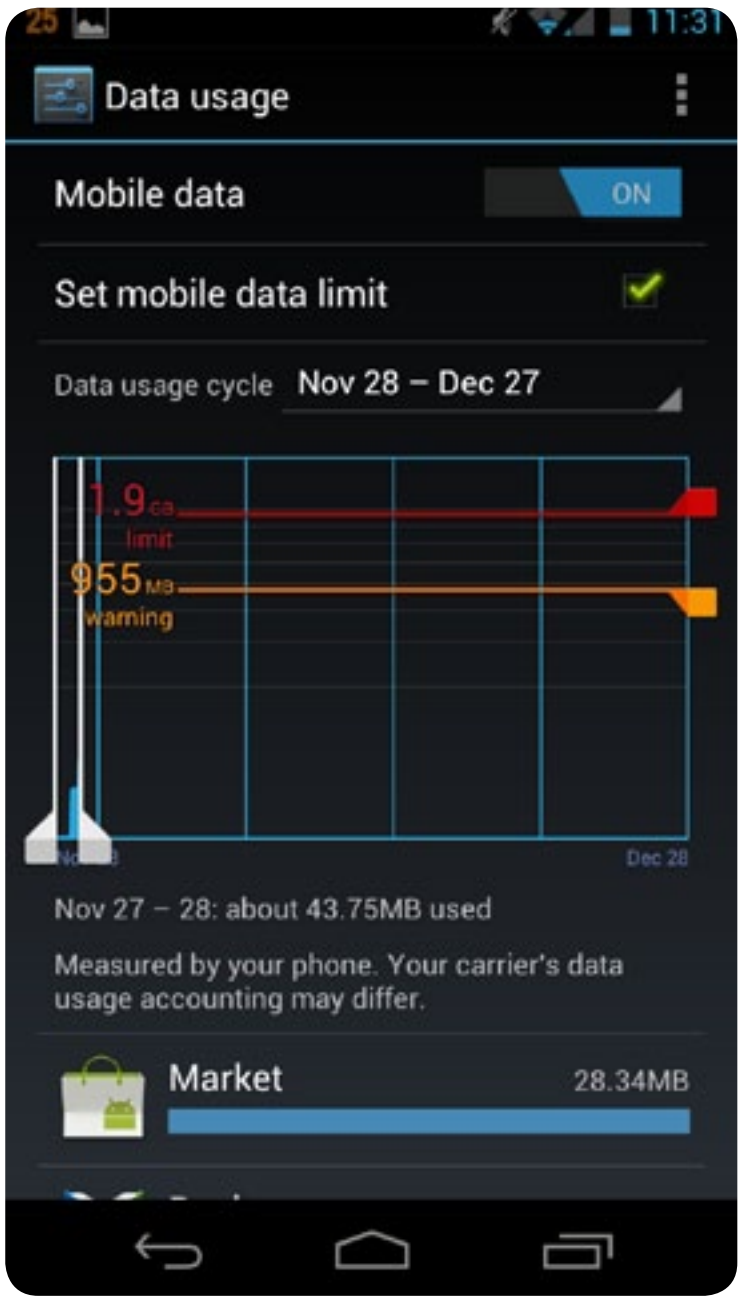
While we didn't have two Galaxy Nexus units to test the full bi-directional scope of the Beam's abilities, we were able to take advantage of our Nexus S' tag-reading feature to initiate one-way transfers. Apps and websites pushed to the S like a charm, though nothing else worked. YouTube videos pretended to move over, but the tags showed up blank on the other side. Granted, given the limited scope of the phone's NFC powers, none of this should come as much of a surprise. We'll find this feature to become incredibly useful once more ICS phones come with the tech built in, but its reach is massively small at the time of this writing.

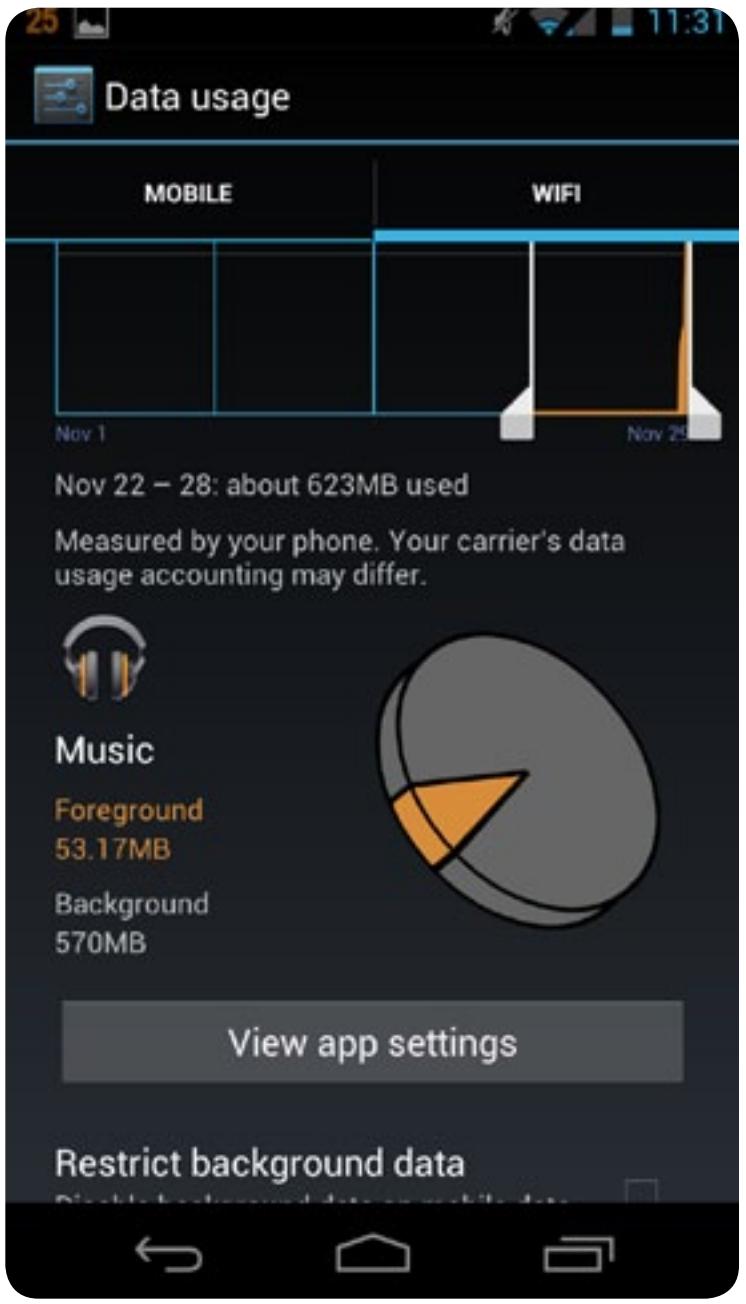


MISCELLANEOUS

Data Monitoring

So you're not one of those lucky saps that still has unlimited data, eh? Data management on Gingerbread was a project that resulted in one or two pieces of bloatware taking up valuable virtual space, but ICS will let you access your overall data usage, warn you when you approach a custom boundary and



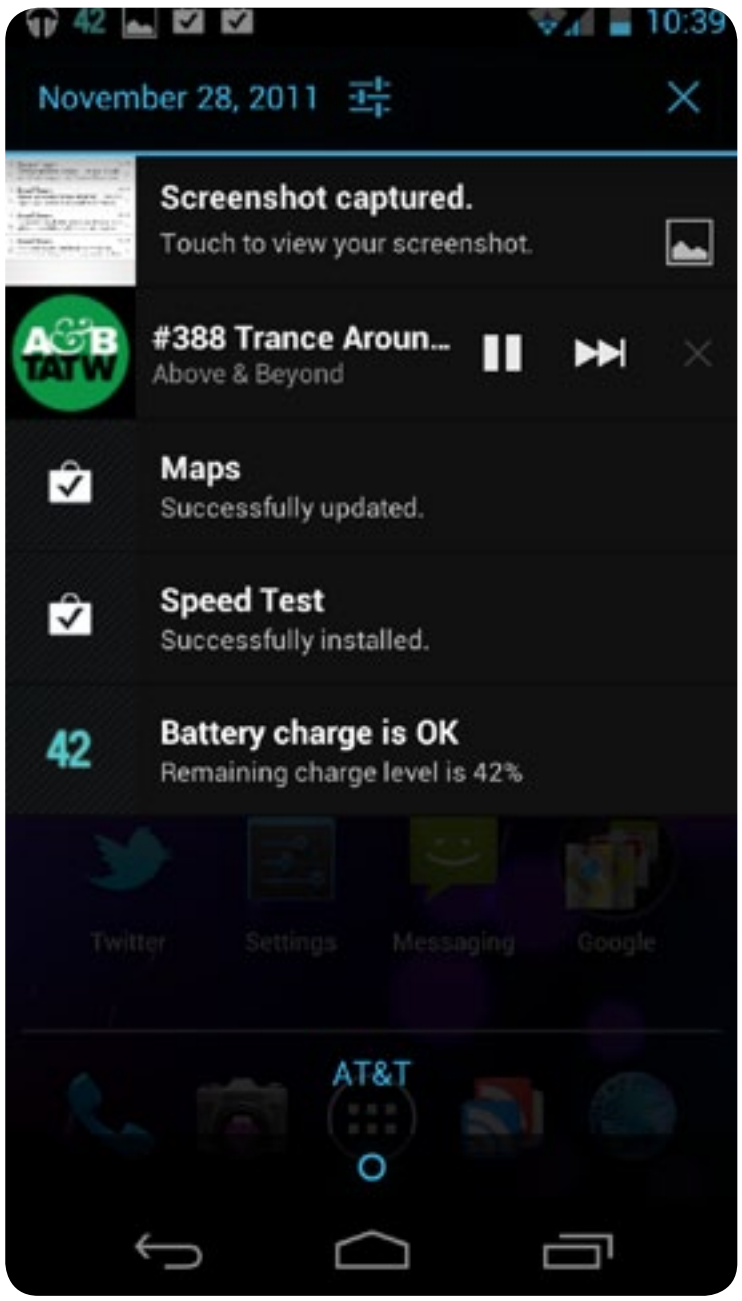


set limits based on your current plan. Have a 2GB plan? You can tell the OS to warn you when you reach 1.5GB, and then have the phone shut off access to the internet once you hit your monthly data allowance. You can also tell specific apps not to collect data or incur usage when it's running in the background, or just restrict those apps to only do so when you're in a WiFi zone.

We do need to make one critical disclaimer here, however: the numbers offered up by ICS may not accurately reflect the same numbers your service provider offers up. So don't rely fully upon Android to do all the dirty work for you — if you believe you're quickly approaching your limit, we still recommend checking with your carrier to make sure you're safe.

Screenshots

We were absolutely elated when we learned Android 4.0 would add the ability to take screenshots natively. While a couple Gingerbread devices somehow found a way to make this happen, the fact that it's officially sanctioned in stock Android is rather joyous. Previously, taking screenshots was a lengthy process that involved plugging your phone into a computer, making sure the right software was downloaded and Mars and Jupiter had to be aligned with Mercury in a perfectly straight line in the evening sky.



With ICS, simply hold down the screen lock / power button and the volume down button for around one second. The shot magically goes into its very own screenshot folder, and we were able to drag and drop the files from there onto our computer with absolute ease.

Disable Unwanted Apps

Dost our eyes deceive us? Could it be? Yes! Ice Cream Sandwich — in its pure vanilla state, at least — lets you disable virtually any app on your phone. That's right, even the essential ones that you might actually use from time to time. Granted, these apps haven't actually gone anywhere, so they're still taking up storage space. They are, however, at least out of your hair.

The wild card (as you probably expect) is OEM skins and carrier customization. We can easily see HTC quietly dismissing this feature — among others — in Sense 4.0. So this is absolutely a step in the right direction for stock devices, but what will happen to every other phone or tablet that becomes subject to the manufacturer's desires?

Easter Egg

How much do those clever folks on the Android team love Easter eggs? Enough to include one in each successive update, at least. A picture of "zombie art" by Jack Larson was hidden in Gingerbread, and Honeycomb featured a bee. ICS followed suit with an image of the Android robot dressed up in an Ice Cream Sandwich, which grows in size when you long-press it until it transforms into a Nyan Cat-style animation. We love Easter eggs as much as anyone else, but usually each of these gems can easily be found by going to the "About phone" option in the settings menu and pressing the Android version repeatedly until the robot pops up. That's not a well-kept secret anymore, to say the least.

The real surprise came when we actually found a *second* Easter egg called Rocket Launcher, and the Android Team kept this one a much better secret — it takes a little trickery to activate. The Launcher looks like a screen saver; it shows all of your installed apps flying past you through space at dif-



Android Beam, introduced in ICS, wants to slap the general public in the face with a large helping of NFC technology.

ferent speeds and angles. Here's how to activate it using stock ICS: download and install Launcher Pro on your device, go into your standard launcher's widget menu and locate "activities." Drag and drop the widget onto your home screen, and a long list will appear. Locate and select "launcher," and Rocket Launcher is hanging out inside. The first time you try to use it, the program won't work properly. Exit out and go back in, and you'll find yourself flying at warp speed with icons zooming past you in every direction.

DOWNFALLS AND SHORTCOMINGS

Flash Player

Wait, what? The effect of Adobe's recent decision to silence mobile Flash may seem to have reached ICS, though the company's assured us that even though the Player faces an eventual death, it has one more update left in it and it's for sure coming to Android 4.0 before the end of the year.

However, there is a slightly devious workaround to this problem, though it

isn't foolproof. To our delight, we found that we could technically sideload the Flash Player 11.1 APK onto the Galaxy Nexus — tragically, however, it didn't seem to work out quite as well as we'd hoped, as it only worked on a scant few Flash-enabled sites. But hey, it was worth a shot, right?

Facebook Syncing

We briefly mentioned some concerns with Facebook earlier in the review, and it's worth circling back on these particular issues. In our time with ICS, it grew apparent that the social network's experience on the new firmware is a bit behind. Facebook contacts cannot be synced into your address book or People app; when attempting to access your account through the settings menu, you're greeted by an option for Facebook on the list, but pressing it just takes you back to the previous screen. We imagine this will be worked out in due time, and if nothing else, we'll likely see OEMs come up with a workaround of their own.

Legacy Apps

No need to act terribly surprised here, given how fresh ICS is out of the virtual box, but many legacy apps optimized for older versions of Android may not work as well as we'd like them to — at least, not for a little while. The new OS smell still emanates from Android 4.0, which means the vast majority of developers are hustling to get their apps ready for primetime. Since it's too early to get a firm grasp on how well these applications will perform once they're optimized for ICS, we'll hold off on the final judgment of third-party app performance until a later date.

No Google Wallet

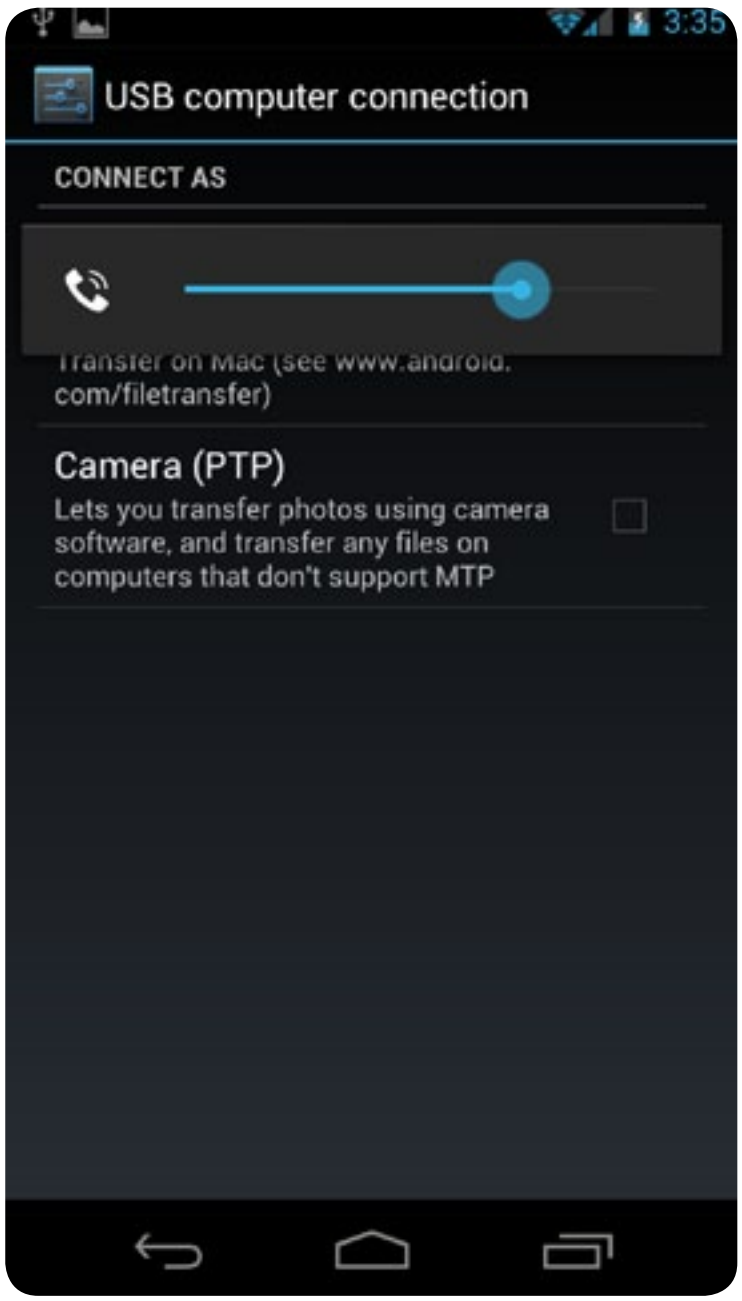
In what seems like an odd step backwards, Google Wallet — an NFC-based mobile payment service available on the Samsung Nexus S 4G — is completely missing on the Galaxy Nexus. We have a sneaky suspicion that this will eventually be enabled on ICS phones, but Google has remained quiet on the matter for now.

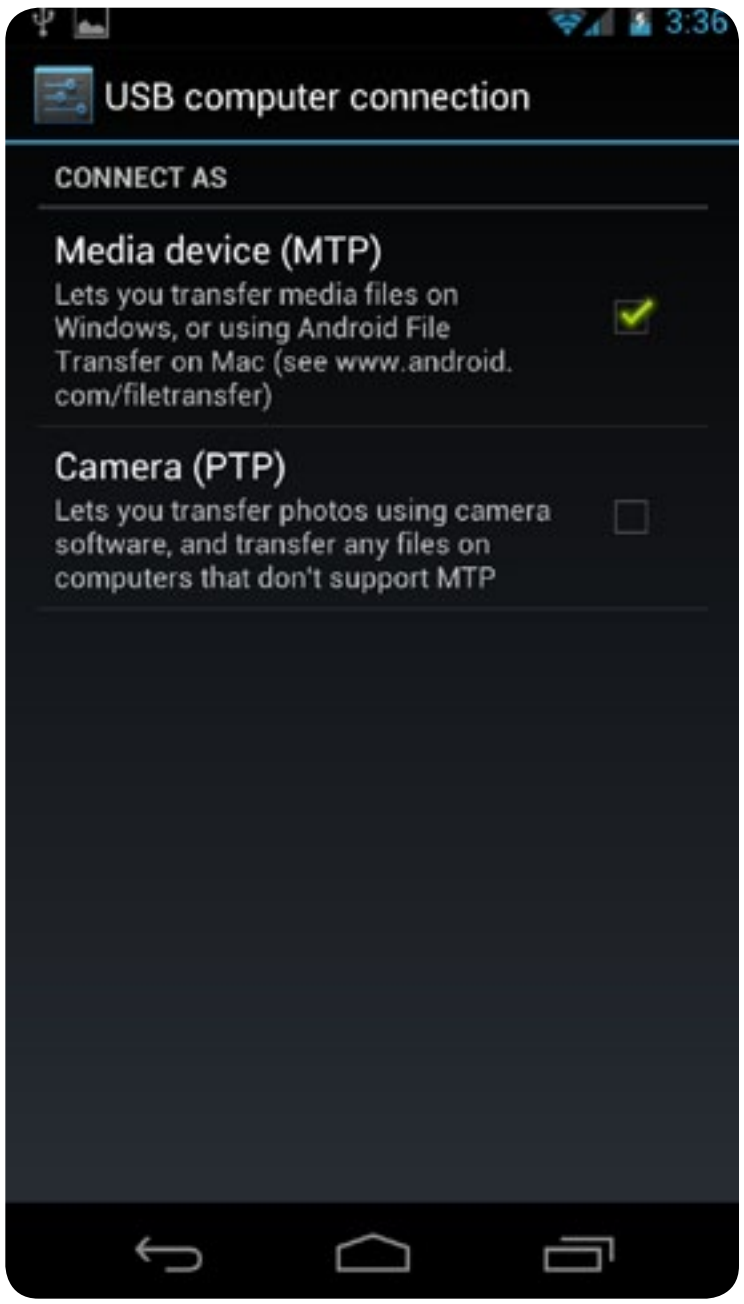
USB Mass Storage

We had a brief moment of geeky panic as we fired up our Galaxy Nexus only to discover that USB mass storage was nowhere to be found, but rather only supported MTP / PTP file transfers. While we originally assumed this was a restriction based on ICS itself, it was determined that the firmware does indeed support it — on devices that offer expandable storage, anyway, a feature the Galaxy Nexus lacks.

WHAT'S AVAILABLE TO DEVELOPERS

So we've covered the visible portion of ICS at length, but haven't taken much time to dive deep into what types of features developers will be able to take advantage of behind the scenes. Here are just a few of the various APIs





and other services made available in Android 4.0.

WiFi Direct

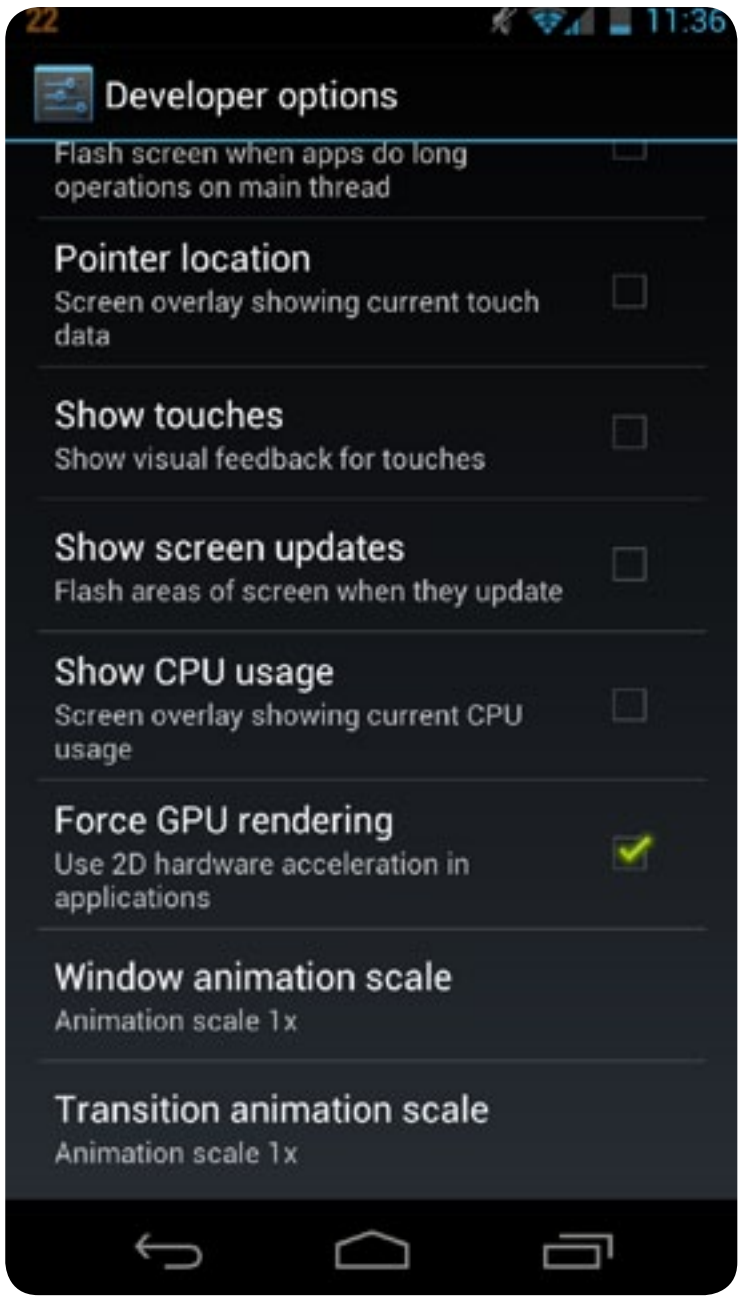
WiFi Direct is a relatively new concept for phones, one that hasn't been highly utilized. Essentially, the tech enables devices to connect directly to one another without needing a router or internet connection to act as a middleman. In other words, it gives your Android phone another method of sharing pictures, files or just about anything else with your desktop computer — but it can also connect a group of gamers, stream media content from your ICS phone to an audio player, print files and so on.

Hardware Acceleration

To be clear, hardware acceleration was an option made available for Honeycomb tablets and has finally been expanded to cover phones in ICS. Ultimately, Google's added framework support for hardware acceleration in both versions so that developers can enable it on their apps simply by adding a single line of code.

Bluetooth Profiles

Google has included support for connecting to Bluetooth Health Device Profile (HDP) devices, which means ICS is capable of hooking up to heart monitors, sensors in hospitals and a whole load of various wireless medical devices. Also



included in Android 4.0 is support for Bluetooth Hands-Free Profile 1.6.

USB Game Controller and HDMI Support

As it turns out, our future game consoles may not actually be standalone machines at all, but rather our actual phones hooked up to a TV via HDMI. This could be made possible through ICS's support for external USB game controllers — using a USB-to-micro-USB adapter, of course — and the usual HDMI to go along with it. This was enabled for Honeycomb tablets, but this is the first time we've seen the ability on Android handsets as well.

Visual Voicemail

Confusion erupted when the Samsung Galaxy Nexus came out with visual voicemail inexplicably missing from the firmware — rightfully so, since we were all originally told in Hong Kong that the functionality would be included in ICS. After a bit of clarification on Google's part, we now understand that this feature is actually buried deep within Android 4.0 in the form of an API. This way, developers can work closely with carriers or other third parties in order to take advantage of it.

Accessibility

ICS has made some progress on the accessibility front as well. Earlier we talked about how to enable the functionality directly from the setup screen, and our above video dives deeper into exactly what you can do. Specifically, ICS brings a new explore-by-touch mode that offers audible feedback on any part of the screen you may touch. Touching an icon, for instance, prompts the phone to tell you what you're touching — but it doesn't activate that icon until you press it a second time.

A web script-based screen reader on the internet browser can read out content and assist the user in navigating websites. The font size can also be increased.

Devs also now have access to accessibility APIs such as Text-to-Speech and explore-by-touch.



Sensors

With ICS comes support for two new sensors: ambient temperature and relative humidity. Yes, we're one step closer to turning our phones into tricorders, and we couldn't be happier about it.

Enterprise

Work in a facility that doesn't allow cameras? Finding a phone of any decent quality that doesn't have at least one camera is incredibly difficult these days, making your options a bit limited and frustrating. ICS adds Device Policy Manager, which can remotely disable your phone's camera. There's also an API for keychains (encrypted credential storage) as well as one for VPN clients, which offers even more options for developers to appeal to the Enterprise.

Other APIs Included in ICS

We can't include every single new API in our review without turning it into four or five separate articles, so we'll just offer a few small tidbits.

Additional APIs for the camera give access to continuous focus, ZSL exposure, image zoom and even offers devs the ability to capture high-res photos while taking video. Apps can also now set custom metering "regions" and then adjust exposure and white balance dynamically within those regions.

A new social API gives third parties (primarily social networking apps, we presume) the opportunity to integrate into the address book. Other APIs are now available for the calendar, Android Beam, low-level streaming media and audio remote controls.

Honeycomb API

There are plenty of elements introduced in Honeycomb that still hadn't seen the light of day in a phone, so ICS includes several of them in the package. In addition to the features we've discussed already, here are a few more: renderscript 3D graphics, HTTP live streaming, improved screen-support API, property-based animation, MTP / PTP file transfers and support for RTP.

Wrap-Up

If you argue that Ice Cream Sandwich isn't the largest incremental update to the Android platform since its birth, you're probably going to lose the fight. Not even counting the number of features added to 4.0, the changes in UI alone are enough to take your breath away. It's modern and refreshing, and the user experience is more polished than its predecessors, but we believe that newcomers to Google's mobile ecosystem won't find it quite as intuitive as competing operating systems as the tech-savvy and power-hungry crowd that has grown accustomed to Android in the past. Regardless of previous knowledge, this will probably be water under the bridge soon enough, as manufacturers push out devices with customized skins.

The interface isn't perfect, and several of its new features still have a beta feel (we're looking at you, Face Unlock), but Android 4.0 appears to do exactly what it set out to do: merge the best of two worlds into an attractive package. It's a gorgeous OS that offers great performance and — for the most part — doesn't feel like a half-baked effort. Factoring the new functionality, ICS effectively throws a one-two punch of mobile wonderment in our face. Ice Cream Sandwich feels like a natural evolution for Android, and we have a feeling Matias Duarte & Co. are just getting started.

BOTTOMLINE

Google Android 4.0

$N/A

PROS

- Refreshed UI offers a modern feel
- Improved keyboard and text input
- Tons of additional features

CONS

- Face Unlock is half-baked and gimmicky
- Not very intuitive for first-time users
- Poor Facebook integration

» Ice Cream Sandwich is the largest and most attractive Android update we've seen so far, with a fresh UI and a litany of new features.

Brad is a mobile editor at Engadget, an outdoorsy guy, and a lover of eccentric New Wave and electro. Singer and beatboxer.

Zach Lutz and Myriam Joire contributed to this review.

CARRIER IQ

BY ZACHARY LUTZ

What It Is, What It Isn't, and What You Need to Know

Carrier IQ has recently found itself swimming in controversy. The analytics company and its eponymous software have come under fire from security researchers, privacy advocates and legal critics not only for the data it gathers, but also for its lack of transparency regarding the use of said information. Carrier IQ claims its software is installed on over 140 million devices with partners including Sprint, HTC and

allegedly, Apple and Samsung. Nokia, RIM and Verizon Wireless have been alleged as partners, too, although each company denies such claims. Ostensibly, the software's meant to improve the customer experience, though in nearly every case, Carrier IQ users are unaware of the software's existence, as it runs hidden in the background and doesn't require authorized consent to function. From a permissions standpoint—with respect to Android—the software is capable of logging user keystrokes, recording telephone calls, storing text messages, tracking location and more. It is often difficult or impossible to disable.

How Carrier IQ uses your behavior data remains unclear, and its lack of transparency brings us to where we are today. Like you, we want to know more. We'll certainly continue to pursue this story, but until further developments are uncovered, here's what you need to know.

What Is Carrier IQ, Anyway?

Privacy concerns surrounding Carrier IQ were initially brought to light by Trevor Eckhart, a security researcher who became alarmed by the extent of information accessible by the analytic software. In a recent video Trevor presents much of his findings, which seemingly demonstrate Carrier IQ's keystroke logging, location tracking and ability to intercept text messages. Even information that should be transferred only within encrypted sessions is captured in plain text by Carrier IQ. During the entire demonstration, Trevor's phone was in airplane mode, operating only over WiFi. Although his actions were outside the scope of his wireless carrier (Sprint), the software continued to monitor his every key press. On his Android device, it's evident that Carrier IQ is running, even though it does not appear in the list of active processes. Further, the application doesn't respond to "Force Quit" commands, and it's set to startup when Android launches.

If you've seen Trevor's video, it's easy to form opinions that Carrier IQ may be the omnipresent snoop. In some ways, it is. The software has the ability to record nearly every action you perform with your phone. The actual data logged, however, isn't determined by Carrier IQ, but rather its clients. The system enables manufacturers and carriers to examine how phones are used, how they behave and to aid in resolving issues that customers may experience. Clients are able to define specific parameters they wish to track, and also set events that would cause the device to report this information back to Carrier IQ. For instance, a manufacturer may wish to know which currently installed applications use the most battery life, while a carrier may choose to query the devices that experienced a service outage in a particular region during a given time frame.

Unfortunately, without Carrier IQ or its clients being explicit in the information it tracks, there remains a very real concern for individual privacy. As of

present time, nobody is handling this quite well.

The Company

Carrier IQ was founded in 2005 in Mountain View, California. It's a privately held operation, with investors including Accel Partners, Bridgescale Partners, Charles River Ventures, Mohr Davidow Ventures and Natua Capital. Intel Capital is known to be a prior investor as well, although it's unclear whether it still holds equity in the firm. Carrier IQ's management of these privacy concerns so far has been a mess, to say the least. After Trevor Eckhart reported his findings, which included the company's training materials, Carrier IQ attempted to silence him with a cease-and-desist letter, demanding he replace his analysis with a statement disavowing his research. The company has since retracted its threat and apologized for its behavior, but not without first earning a black eye in the process.

The company's newly appointed CEO, Larry Lenhart—who remains part of Mohr Davidow Ventures—recently published a video to YouTube explaining the firm's stance on privacy, in which he outright denies that Carrier IQ records keystrokes or provides tracking tools. Perhaps the company is truthful in its assertion, although the statement seems to contradict the design and capabilities of its software.

The Software

For some further insight into Carrier IQ, we'll examine some of these aforementioned training materials that we obtained from Trevor Eckhart's website, along with one of the company's patents concerning data collection. On the analytics end, the software features a portal that allows administrators to create events that would trigger a Carrier IQ-enabled device to "phone home," and choose the data which is to be sent. Alternatively, administrators may also submit queries to individual devices, either by using an equipment or subscriber ID — or, they may choose to query pools of handsets by inserting wildcards into the string. The extent of information available to administrators upon querying a specific device is unknown.

Seemingly contradictory to Carrier IQ's assertion that it does not collect keystrokes is the company's patent application #20110106942, published May 5, 2011.

The Response

Sprint has denied any foul play:

"Carrier IQ is used to understand[ing] what problems customers are having with our network or devices so we can take action to improve service quality. It collects enough information to understand the customer experience with devices on our network and how to devise solutions to use and connection problems. We do not and cannot look at the contents of messages, photos, videos, etc., using this tool."

HTC also insists it's benign:

"HTC, like most manufacturers, has an opt-in error reporting function built in to our devices. If your phone experiences an error, you have the option of 'Telling HTC' so we can make improvements to our phones. Details about this are in our privacy policy on each device and in order for data to be collected, you have to opt-in. If you do opt-in, we protect your privacy by de-identifying and encrypting the data. HTC is committed to protecting your privacy and that means a commitment to clear opt-in / opt-out as the standard for collecting any information we need to serve you better."

As the Carrier IQ controversy comes to a boil, it's not only privacy advocates that are taking notice. Paul Ohm, a former prosecutor for the Department of Justice and current professor at the University of Colorado Law School believes the software may violate federal wiretap laws, based on its perceived collection of text messages without users' consent. If so, says Ohm, there are then sufficient grounds for a class action lawsuit. He adds, "In the next days or weeks, someone will sue, and then this company is tangled up in very expensive litigation. It's almost certain."

There's no denying that lawsuits can be a royal pain for everyone involved, but if it escalates to that level, a good possibility exists that Carrier IQ will be required to disclose the extent of its data collection in the discov-

Excerpt from patent application:

UNITED STATES PATENT AND TRADEMARK OFFICE
DEPARTMENT OF COMMERCE

2.

A method for collecting data at a server coupled to a communications network, comprising: transmitting to a device a data collection profile, wherein the data collection profile comprises a plurality of parameters defining a set of data to be collected by the device, a first condition under which the set of data is to be collected, and a second condition under which the set of data is to be transmitted; and receiving from the device the set of data collected in response to the second condition.

10.

The method of claim 2, wherein the set of data relates to an end user's interaction with the device.

11.

The method of claim 10, wherein the interaction with the device comprises the end user's pressing of keys on the device.



ery process. Our take? If it requires a courtroom battle to force transparency about the collection of your information and usage habits, then bring it.

In an industry where the protection of intellectual property is paramount, it seems that so much of this controversy could have been avoided with a simple opt-in policy. Executed properly, Carrier IQ has the potential to improve the quality of service for millions of mobile customers—provided that the data collected stays on the up-and-up. What remains clear is that until Carrier IQ or its partners address these privacy concerns with explicit evidence and formal policies to the contrary, this issue isn't going away.

What You Can Do

If you're curious about the existence of Carrier IQ on your current Android handset, a simple application from Trevor Eckhart will give you the answer. His Logging TestApp requires that your phone be rooted, but thankfully, once you've gone that far, you've got a decent shot of removing the software from your phone entirely. Perhaps the most direct way to distance yourself from Carrier IQ is by installing a custom ROM that's built from the Android Open Source Project (AOSP). Alternatively, the pro version of Logging TestApp — available in the Android Marketplace for $1 — has also proven successful in most situations. Methods also exist for manually removing Carrier IQ from individual devices, which can be found within the forums of *xda-developers*.

Latest Updates

Jeffrey Nelson of VZW corporate communications has confirmed that Carrier IQ isn't on any of its handsets.

All Things D has received a statement from Apple on the Carrier IQ situation. It says that it "stopped supporting Carrier IQ with iOS 5 in most of our products," and that it will "remove it completely in a future software update." The company's full statement is as follows:

"We stopped supporting Carrier IQ with iOS 5 in most of our products and will remove it completely in a future software

update. With any diagnostic data sent to Apple, customers must actively opt-in to share this information, and if they do, the data is sent in an anonymous and encrypted form and does not include any personal information. We never recorded keystrokes, messages or any other personal information for diagnostic data and have no plans to ever do so."

In addition to Sprint, AT&T has now also confirmed that it does indeed use Carrier IQ on its handsets, but both carriers insist that it is solely being used to improve network performance. For its part, Microsoft has confirmed that Windows Phones *do not* have Carrier IQ on them—that word comes straight from Joe Belfiore. And the statements keep on coming. Here's the latest word from HTC, which lays the blame squarely on the carriers:

"Carrier IQ is required on devices by a number of US carriers so if consumers or media have any questions about the practices relating to, or data collected by, Carrier IQ we'd advise them to contact their carrier."

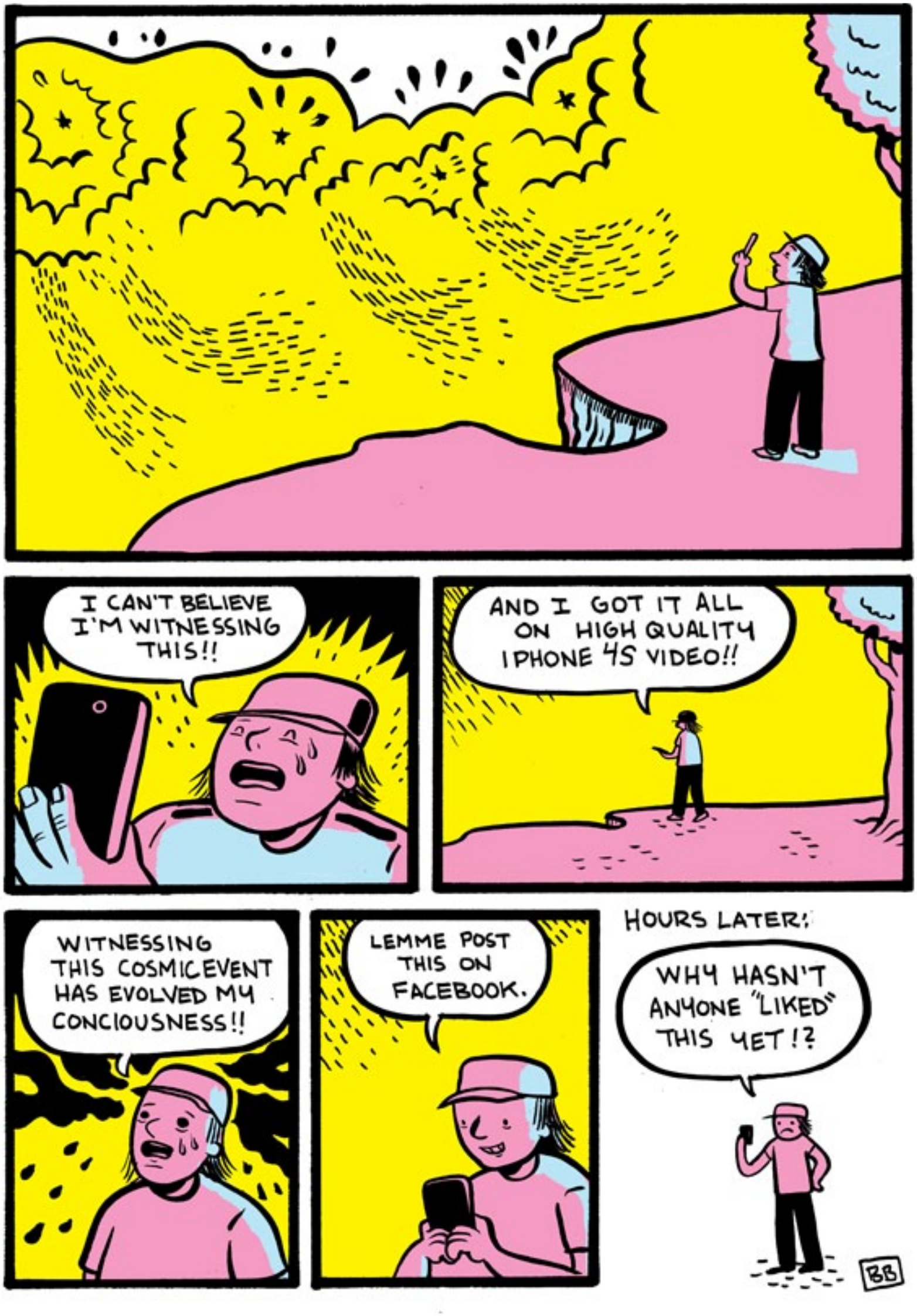
"It is important to note that HTC is not a customer or partner of Carrier IQ and does not receive data from the application, the company, or carriers that partner with Carrier IQ. HTC is investigating the option to allow consumers to opt-out of data collection by the Carrier IQ application."

If it requires a courtroom battle to force transparency about the collection of your information and usage habits, then bring it.

Like clockwork, Carrier IQ has re-reiterated its stance:

"Carrier IQ is aware of various commentators alleging Carrier IQ has violated wiretap laws and we vigorously disagree with these assertions. Our software makes your phone better by delivering intelligence on the performance of mobile devices and networks to help the Operators provide optimal service efficiency. We are deployed by leading Operators to monitor and analyze the performance of their services and mobile devices to ensure the system (network and handsets) works to optimal efficiency. Operators want to provide better service to their customers, and information from the device and about the network is critical for them to do this. While in-network tools deliver information such as the location of calls and call quality, they do not provide information on the most important aspect of the service—the mobile device itself."

Zachary is too much of a Stones fan to be a good hippie. He's just trying to learn and do good where he can.



The Last Word - Box Brown

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